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IDEA TO INVENTION
PROJECT REPORT

DAN AICHER
PM686B

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Abstract

The United States Patent and Trademark Office (USPTO) estimates that 1-3% of patented inventions produce profits for the inventor. The cost of filing and examination for a non-provisional patent can range from $2,000 to $10,000 and beyond. ATC Company understands this uncertainty and will undertake a project to invent a new shelter product and determine its marketability, prior to investing in a non-provisional patent. The Idea to Invention project objective is to apply Project Management principles and develop a process for inventing an idea, measuring the idea's utility and commercial viability as a product, conducting a patent search and producing a thorough Provisional Patent Application. Specifically, the project will deliver both a product line of ATC's and a process for establishing first to invent rights to patenting the ATC's function and method of operation. Unlike most recreational tent products available, ATCs do not require a flat or suitable site for setup; rather, ATCs deliver ultra-lightweight, highly adaptable weather protection and concealment nearly anywhere in the field.

Literature Review Results

Idea to Invention (I to I) undertook market research, R&D and conditions use testing and an invention assessment to accomplish the research required to support the work and achieve stated objectives in the PMP. The Project identified users and estimated populations of targeted user groups to quantify the size of multiple markets, and learn the most effective methods of presenting the All Terrain Cover (ATC or "Cover") product to these markets. Market analysis segmented user groups and their needs and buying preferences which directed the focus of marketing activities. Product marketability research was conducted by testing local and online demand.

Concurrently, a comprehensive domestic patent search was undertaken to research the patentability of a product idea. Patent search methods evolved and were improved as the Project was elaborated; initial patent research methods were based on patent classification searches to start gathering groups of related patents. Multiple patent search strategies were then used to gather as many relevant patent claims as possible, and systematically review each one for similarities to the ATC design concept.

ATC R&D and conditions use testing improved and defined the ATC design. This research allowed the PM to draft and file a Provisional Patent Application (PPA) to secure first to invent rights to the ATC's function and method of operation. A PPA was filed prior to completing a conclusive patent search as the Project learned a conclusive patent search is nearly impossible. The "Adjustable Tent; All Terrain Cover" PPA is provided in Appendix B, Provisional Patent Application (PPA). Although executing a patent search is project requirement and a best practice to avoid patent infringement. Patent research progressively defined search strategies while reviewing and eliminating individual patent claims. The Project identified three (3) patent classifications and twenty-seven (27) patent sub-classifications. The PM reviewed approximately 3,700 non-provisional (NP) patents and 780 NP patent applications. Three existing patents were found to be similar to the ATC in design and utility although not in function, or method of operation. Upon researching referenced patents cited within these three (3) existing patents, none were found to be highly-similar in design.

Additionally, Idea to Invention acquired significant amounts of information on Product Lifecycle Management, New Product Development (NPD), TRIZ, and Patent Search efficiencies and strategies. The Project scope of work did not include complete application of these disciplines, but rather learned and applied the most relevant concepts to strengthen and improve the effectiveness of the work.

Project Management Approach

Idea to Invention employed a systems based approach focused on integrating Scope, Risk and Quality Management processes to deliver the All Terrain Cover. Being a product based invention project the Scope Management Plan, and specifically the change control process, was designed in a way to seek out and identify constructive changes to the Project, and also the ATC design. Work was initially planned knowing that research would uncover and elaborate essential information, and the Project actively applied this information to adapt as needed to meet Project objectives. The Project Manager's (PM) approach to the work was to identify and execute the most effective methods of completing key activities, for the purpose of providing conclusions to help answer the questions of "Is it worth my time to invent this new idea?" and "How much consumer demand will there be if I do invent this idea?"

Idea to Invention began by defining the product scope of work which included a detailed description of ATC invention, as well as the product related deliverables the Project would create. The PM knew the project scope of work was highly contingent upon the product scope. As such, the product scope of work was constrained to allow time and flexibility in the schedule. Scope management was used to clarify both a vision for the ATC product concept and a logical sequence of work activities planned and managed in a way to achieve stated objectives. Planning scope management provided a schedule and tools to manage changes to the work, and techniques to control and verify scope to validate the work was creating value for the project, and Project Sponsor.

Project scope was controlled by measuring performance of both the ATC invention and the Idea to Invention work effort. Both subjective and objective performance metrics measured value provided by Covers in the field, and marginal utility delivered by accomplishing each work activity. Value Metrics were utilized as a way to quantify intangible value such as the feeling of being outdoors and not getting wet when it is raining. Users in the field were overheard inflating the perceived monetary value of being under an ATC in the blowing wind and snow; they seemed to be willing to accept a higher than anticipated price point for the Cover when asked in the field. This observation is an example of how the Project verified scope to validate the ATC's performance with potential users and also ensure the Covers where accepted by the Project Sponsor.

Additionally, the features and functions of an invention must be clearly defined in a patent application filing for the claim to have any amount of usefulness (M. Bellis, 2012). The PM detailed the ATC design with much specificity in an attempt to claim the most functionality and utility in the PPA as possible. Patent research suggested casting a "claim net" far and wide to capture all of the inventor's innovation and claim it as intellectual property (IP), and subsequently deduce what claims were not original (Smith, 2009). Scope management provided a method for the PM to define what features the ATC would have and how the ATC would function while tracing the scope of the invention back to user requirements. The scope of the invention was defined by user requirements while the project scope of work was defined and changed according to requirements related to meeting project objectives.

Overall, the All Terrain Cover was delivered as a solution to mitigate the effects of risk related to weather exposure. The Idea to Invention project Risk Management plan attempts to avoid and mitigate the effects of significant project risks, while also providing analysis to support decisions for accepting risk and planning response activities. I to I project Scope and Risk Management combined to provide an integrated framework for planning and continuously monitoring and controlling the work. The scope of the invention was limited by uncertainty related to the ATC's patentability. To determine patentability the Project incrementally decreased uncertainty surrounding the ATC originality by conducting a preliminary patent search early, and a more extensive patent search later in the project to further support the ATC's patentability. Managing project related risk is the key purpose for the extensive patent search, as identifying a highly similar existing patented invention would be cause for project termination. Patent search work activities were split to provide time and integrate Quality Management related work.

Quality is a critical characteristic in a marketable consumer product, and delivering a marketable product is a main objective of undertaking the work. Quality requirements dictated the entire scope of the Idea to Invention project and performance was measured upon how well the Project conformed to requirements, as well as how much value the ATC provided to end users. The Project assumed that creating value for

end-users would have a causal effect on meeting their requirements, specifically more tangible and intangible value than the Cover's cost. Of course functional and basic quality requirements as well as Poke Yoke features were designed into the ATC manufacturing process. Throughout the project duration Quality Management complimented Scope Management by employing Value Metrics, which provided project information for the PM to use for managing changes to the work and validating deliverables.

The ATC product line includes three (3) models of ATCs to meet user requirements in similar but different target markets. Six (6) Cover prototypes were built off of two (2) templates. Prototypes were measured as stated in the PMP. Shelter outputs were inspected by taking five dimensional measurements to check symmetry and strength; two subjective observations of appearance; and, three tests of stability when directional forces were applied. All prototypes measured out within dimensional tolerance although the sample size was limited to two (2) for each ATC model. Quality Management work reinforced the scope of the invention and defined requirements for the I to I Project to meet. As Quality and Scope Management defined the work and the direction of the Project, Risk Management sought to protect and enhance the work to more effectively meet the Project objectives faster.

After the research, prototyping and testing work activities were completed the All Terrain Cover was at 100% design. ATC design drawings are provided in Appendix A, ATC Drawings. During this work the PM exploited any opportunity to record the ATC performing and providing weatherproof protective shelter in various backcountry environments. Idea to Invention gathered video footage and photos of the ATC as the Project forecasted eminent change to the work to penetrate the market, and presentation material was needed to introduce the ATC to potential target market users. As preliminary patent search work was completed the Project filed a PPA to protect the idea to safely expose the ATC product to the market. Concurrently change was planned to deploy an aggressive marketing campaign mainly online thru the Kickstarter crowdfunding website, social media, as well as brick and mortar outdoor retail stores.

Within a three-week period following the ATC PPA filing the Project had reached of over 15,000 people in multiple target markets; 3% of these individuals viewed the ATC Kickstarter page and the marketing commercial has been viewed approximately 700 times. A main Project objective was to sell five (5) ATCs by December 2014; at this time ATC project supporters have ordered eleven (11) Covers. Information gathered thru Scope and Quality Management activities is available on the ATC website, AlaskaATC Facebook page, and Kickstarter.

Market Identification and Business Need

There are many types of tents such as shelters, canopies, tarps, tipis, and rain flies readily available on the open market. Tents are generally classified into two (2) categories: freestanding (FS) and non-freestanding (NFS). FS tents can stand upright without any other support. NFS tents cannot stand upright without being supported, most commonly needing to be staked down on multiple opposing sides. FS tents are typically stronger and relatively easy to set up, although these attributes come with increased weight. Also, FS tents require a suitable site for setup and cannot adjust to uneven terrain.

NFS tents are generally lighter, require fewer poles and thus are more portable and typically provide more coverage for the user. Although, NFS tents cannot stand upright without being tied or staked down to adequate soils or readily available rocks and brush of the right size to fit the guy lines. Additionally, NFS tents require a suitably flat site for setup as a center pole needs to be perpendicular, or normal to, the ground plane of which the tent is being set upon. Other NFS tents such as tarps require two (2) trees or

other solid vertical features to string a "ridgeline" in between, subsequently staking the tarp out on either side using the ridgeline as a peaked canopy.

Many times in the field when an individual discovers a promising vantage point, suitable, open and even terrain is nowhere in the vicinity.

Scope Management from Idea to Invention

When an idea is conceived for a new product invention it is easy to get carried away with all the features and functions that could be included to add utility for the end user. Many times when users were exposed to the ATC they all had good ideas for additions that could make it "better." Inventor's want to deliver a product that meets all user requirements, although in most cases this is not feasible. Project Scope Management focuses on needed requirements. And as such, the scope of the invention must meet core user requirements but does not need to meet every user's requirements. Additional features and functions require additional time and money to deliver in a product. A more complex invention increases the probability that specific functional components of the invention have already been patented, while also increasing the scope of the patent search. Project and product scope requirements are maintained in the Idea to Invention PMP.

Scope management was employed for both the ATC product scope as well as the Idea to Invention project scope of work. The Project used scope management to define requirements that would dictate the ATC's overall design and function. Project work activities were then created around both the product and project scope of work, and subsequently sequenced in logical order. The PM expected significant change throughout the duration due to research, opportunities, or other factors that could be advantageous to the Project. For this reason the Change Management Plan included specific criteria to be used in evaluating change requests, and also a change control process to formally track and approve changes to the scope baseline.

Scope Management was used extensively throughout the Project to plan, sequence and validate the work required to answer the following questions:

- What will the ATC ultimately provide for the user, and how exactly will it work?
- How will an individual with constrained resources meet the project objective of inventing a marketable product, and selling it within a given period of time?

The first question is related to product scope and is critical to define for conducting a patent search and filing a PPA. Inventors who seek to patent their invention should expand on this answer in the process of reducing the invention to practice. In this stage the invention is explained clearly and in as many different ways as possible, so as to claim and encompass as much originality as possible. Additionally, an inventor needs to know exactly how an invention works to better understand the scope of work required to deliver the invented product to market.

Answering the second question provides a guideline to plan, execute, and manage the project scope of work. Managing an invention project's scope of work requires creativity, flexibility, and order for decisions to be made during the project. A method for inventing and managing the work required to deliver the ATC to market is included in the PMP. This method was learned and improved thru execution of guided research activities as well as seeking out opportunities to expose ATCs to target markets.

Product Scope Definition

Summary of the Invention

Aptly named the All-Terrain Cover (ATC), the invention is an adjustable tent designed to be set upright on various types of uneven and/or unsuitable terrain, as well as suitable terrain, providing strong and stable immediate cover for concealment and protection against weather elements.

Detailed Description

Figure 1 represents the invention (ATC) from an isometric angle with each component itemized in a chart. The ATC's frame is made of a plurality of poles which intersect and are fastened together at the Intersection Knot (IK)(1) with a cord or other fastening device. The ATC's two (2) or more poles are fastened together secondly by a Main Cord (MC)(8) which is tied to each end of the Spline Pole (SP)(7). The MC (8) is comprised of two cords, tied in a loop at each end and run parallel to the SP (7) and are connected to the Tip End Loop (TEL)(4), and the Tip Front Loop (TFL)(5), both of which are tied to each corresponding end of the SP (7). The MC (8) begins at the TEL (4) at the rear of the ATC and continues up the SP (7) to the Rear Tie-In (RTI) (2).

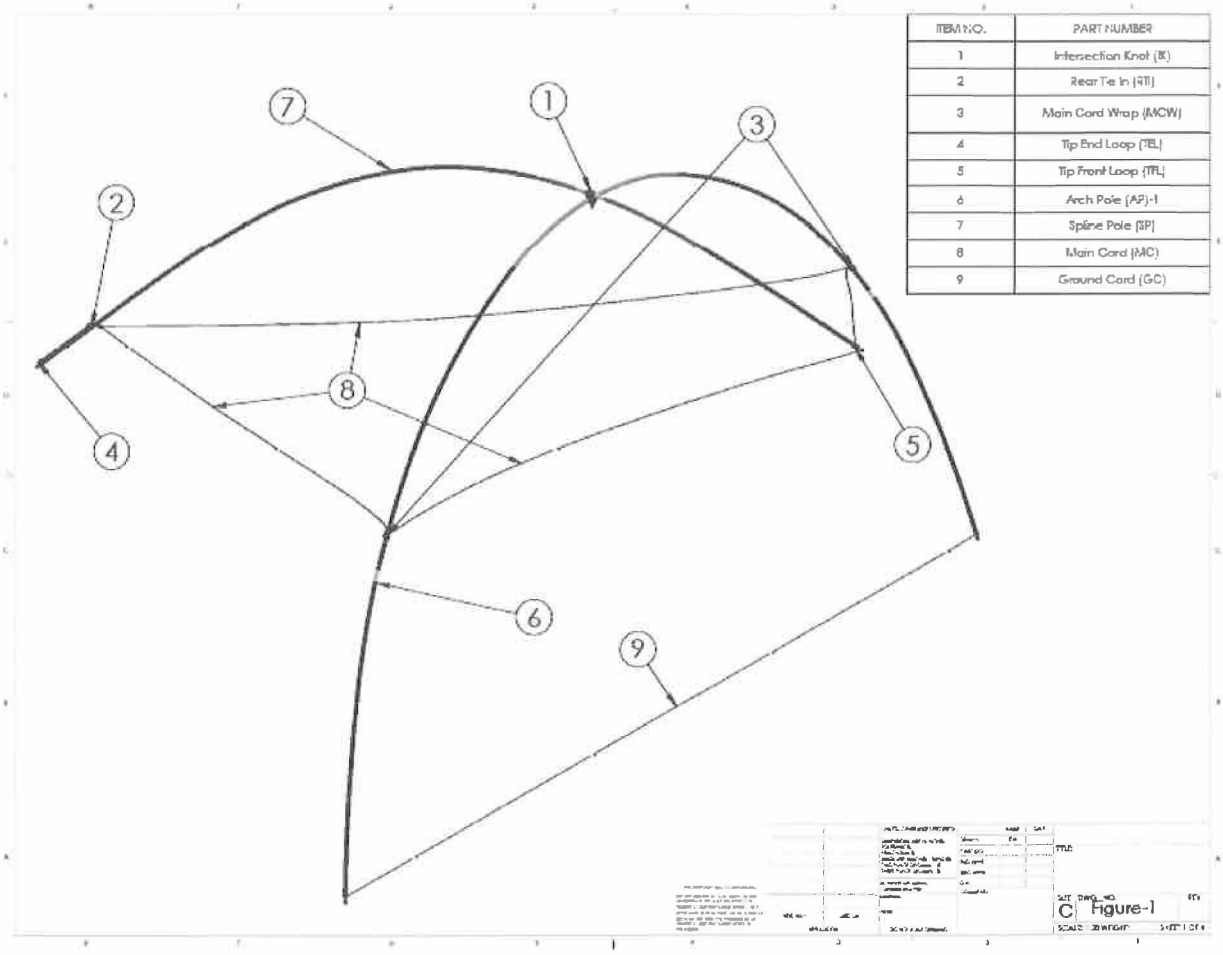

Figure 1: Isometric view of invention (ATC) with itemized components

The RTI (2) is comprised of two (2) knots with two cords in between that tie around the SP (7); at the upper knot of the RTI (2) the main cord separates into two (2) cords which continue forward and wrap around each side of the Arch Pole (AP) (6) two (2) times; once over and once under the incoming MC (8) on each side of the AP (6), as delineated by the SP (7). The sections of MC (8) that wrap around the AP (6) are known as the Main Cord Wraps (MCW) (3). The MC (8) coming out and forward of the MCW (3) continue up to the TFL (5) where the MC (3) is fastened to the front tip of the SP (7).

After all pole sections are put together the AP (6) is connected on both ends by a Ground Cord (GC) (9) which holds the AP (6) upright in an arch shape. When the ATC's MC (8) is slackened and thus not under tension, the SP (7) is approximately straight and resting on top of the AP (6). This position occurs after step #3 of 6 in the ATC setup process, as described in the "Using the ATC" section. In this position the MCW's (3) are kept close together near the SP (7) and in the approximate middle and top of the AP (6); the middle pole section of the AP (6) is a different color than other pole sections of the AP (6) to visually signify area where MCWs are placed for the takedown. From this position the Cover is ready to be put under tension and shaped to provide an aerodynamic weather protective barrier.

As shown in **Figure 2**, the Cover is put under tension by pulling the MCW's downward to a designated, or user determined, location on the AP.

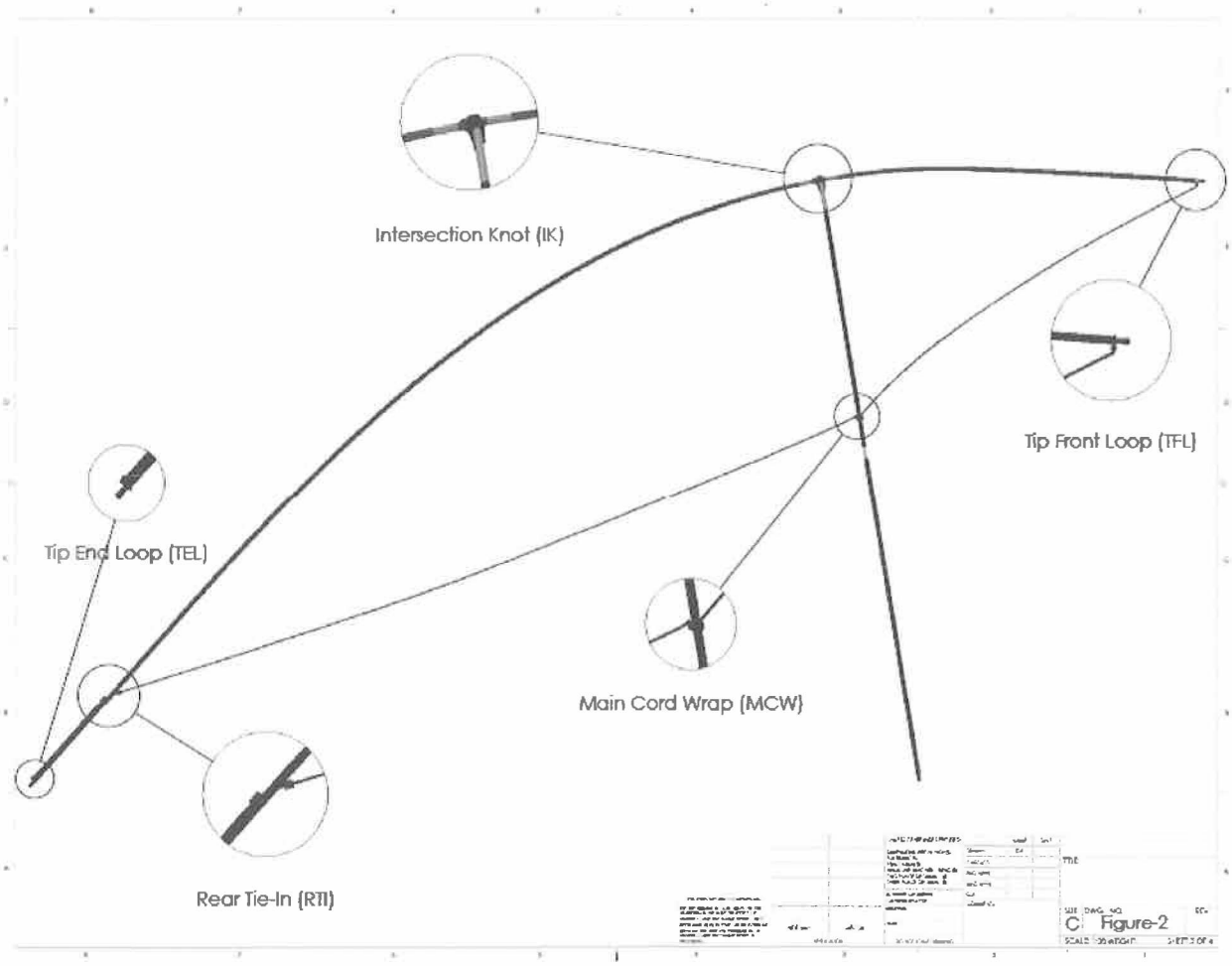

Figure 2: Elevation view of invention (ATC) with details

As the MCWs are pulled downward, along each side of the AP, the MC is tensioned while pulling downward on each end of the SP causing the SP to bow into a spline, creating a ridge shape over the top of the ATC. When the MCWs are positioned as shown in **Figure 2**, with the MC tensioned, the SP is put under hoop stress with each end of the SP resisting outward forces which add and maintain tension on the MC. The AP being connected on both ends by the GC held in an arch shape and put under hoop stress. The tensioned MCW tighten around AP and grip the AP sufficiently to remain static in set locations. When the MCWs are positioned as shown in **Figure 2**, the MC, under tension, pulls and maintains inward pressure on the ATC structure from four points (the TEL, TFP, and on both sides of the AP at the MCW's).

Visual tension markers are placed on AP and SP to designate locations for the MCW and IK respectively. Tension markers on the AP will designate locations for the MCW, for use when the user is setting up a Cover on even terrain; or, to provide a starting point for a user to set the MCW at. Tension markers on the SP delineate the location where the AP should intersect the AP, and thus be the set location of the IK.

The ATC's frame is made of at least two (2) poles which intersect and are fastened together at the IK with a cord or other fastening device. Multiple IK's could be used; if three (3) or more poles are used for the ATC frame then additional IK's are needed to fasten and secure the pole intersections.

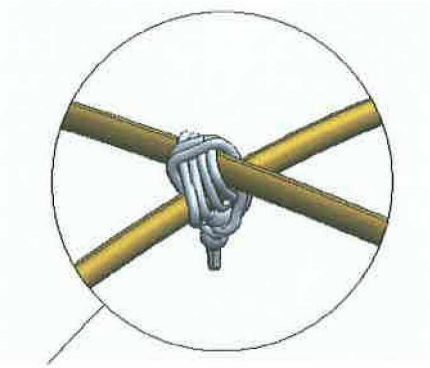

Figure 2.1: Intersection Knot (IK)

The location of the AP and SP intersection, which is fastened together by the IK, is set at approximately one third (1/3) the distance from the TFL to the TEL to optimally balance the ATC structure and proportionally distribute vertical and horizontal loads imposed on the ATC. Covers are designed to sit back when setup; the AP's arch is leant rearward approximately 10-15 degrees to prevent horizontal forces from easily tipping the Cover forward. The ATC's set back tripod design, with equidistant pole bases allow for over two thirds (2/3) of vertical loads to be shed rearward over the ATC's structural pole base. All remaining vertical loads are shed to the side of the ATC's cantilevered canopy overhang. The dimensional location of the AP and SP intersection is such that most of the vertical loads are spread over the pole base, while maximizing the length of the cantilever front canopy to provide open visibility out of the ATC. When the ATC is setup the SP is under tension on the top while being under compression on the bottom, causing the SP to be held under hoop stress. Hoop stress loads the SP with potential energy and causes the SP to exert upward force and support the Cover canopy, and also support vertical loads imposed on the cantilevered ATC canopy overhang.

The IK may be made of a tied cord knot or other fastening device. As shown in **Figure 2.1**, the IK is similar to a "Boy Scout Lashing" where the cord is wrapped around the poles at least two (2) times and tied in a knot when the poles are in a parallel position. As the poles are moved to a perpendicular position the cord tightens due to being stretched and thus put under tension, increasingly gripping and tightening the poles together as the poles are moved further to a perpendicular position. The IK is tied at a specific length to reach optimal grip as the poles are moved to an approximate 90 degree angle or an angle slightly less than 90 degrees in relation to each other. In this position, with the poles fastened and tightened together at the intersection and set at an approximate 90 degree angle, the IK grips the poles sufficiently enough to securely hold the intersection of the ATC frame poles together in one set location, while not crushing the poles due to excessive tightening.

Additionally, the IK is made in a fashion that disallows the ATC pole assembly from rotating the wrong way. The IK is designed to only allow the poles to be rotated about the pole intersection in one direction. Excess cord beyond the IK is used to create a secondary knot, below the IK, which prohibits the poles from rotating to a 90 degree angle in the wrong direction. This feature is necessary so that users cannot open the ATC in the wrong direction. The ATC is designed to be initially opened by putting the pole sections together, rotating the poles counterclockwise, and setting or tightening the IK in a designated location.

A key feature of the ATC is the ability to move the intersection of SP laterally along AP, allowing the ATC to be pitched vertically with the ridge of the SP directly over top of users while on terrain with uneven slope and/or grade. Adjusting the ATC to vertical is done by moving the IK and MCW to the high side of the slope as necessary to maintain the IK directly over users, and set the SP in a vertically centered position, as shown in **Figure 3**.

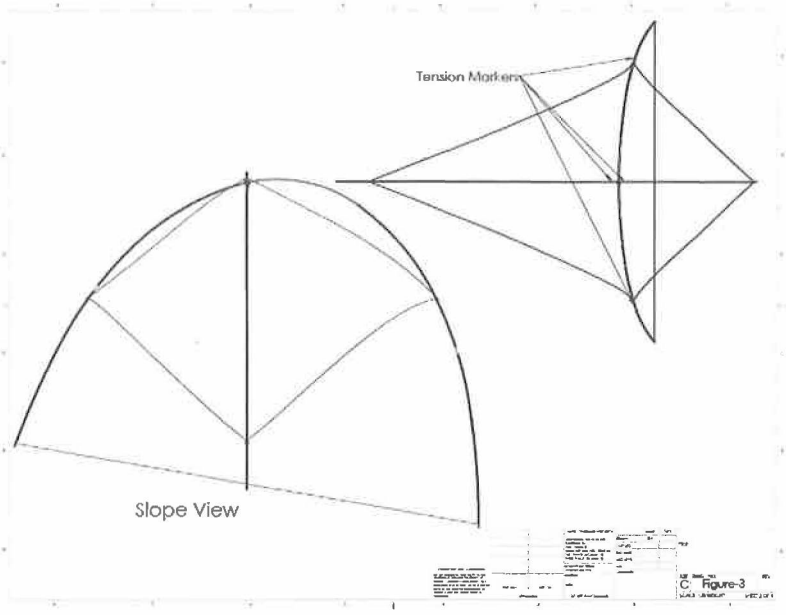

Figure 3: ATC frame vertically adjusted to accommodate slope

The proper "set" location of each MCW will be higher or lower than the tension markers depending on the slope, grade or evenness of terrain; when the ATC is set up on a fifteen (15) degree slope, the IK location will adjust accordingly to the high side along the AP. The IK and thus the top of the Cover canopy are designed to be set vertically providing the most coverage horizontally and directly above the user.

The SP, under tensioned cords wrapped around the AP, is under hoop stress and loaded with potential energy. Hoop stress put on both the SP and AP creates a strengthened frame better configured to resist forces of wind loading and heavy precipitation. Tensioning the MC creates the ATC's dome shape by pulling both ends of the SP down and inward over the AP, and pulling the AP inward creating an open dome protective shelter on three main sides (the rear, left and right sides of the Cover).

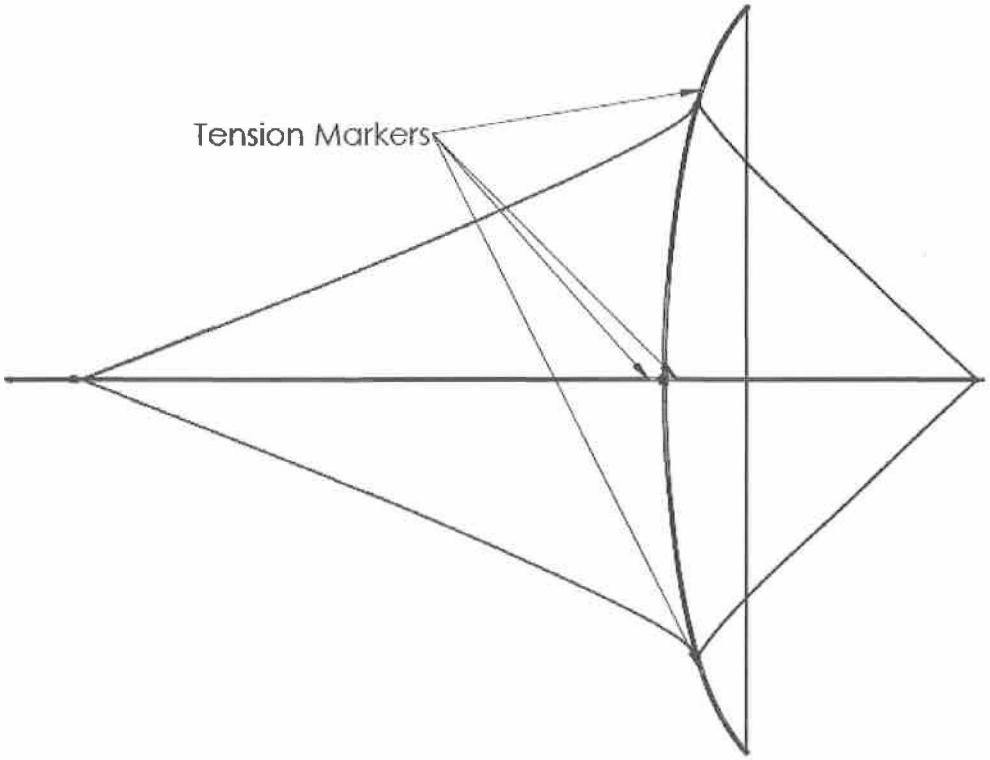

Figure 3.1: Plan view ATC in SYMPOS with tension markers shown

The approximated location of the IK and MCW are dependent upon the terrain's slope and/or grade of which the Cover is being setup on. By using visual markers, on flat and level ground a user can adjust and calibrate the ATC's structural shape in a symmetrical position or "SYMPOS" as shown from the top in **Figure 3.1.** Putting the ATC in SYMPOS is critical to setting up Covers properly. For ease of use SYMPOS visual markers are placed on the AP, SP and MC for the user to see and set the IK and MCWs to on level terrain; or, set within close proximity to the markers if on uneven terrain. Visual markers on the MC are in the form of symmetry knots.

Symmetry Knots (SK) are tied into the MC, at specific locations, and are used to calibrate the length of both sides of the MC to be approximately equal. This action causes the SP to be held at a 90 degree angle

in relation to the AP, and approximately synchronizes both cords of the MC to equal distances, on both sides of the ATC, between each side of the AP to the RTI. Once the ATC is in SYMPOS the Cover canopy will fit the frame in a snug and taught fashion. Also while in SYMPOS, three or more ATC structural pole ends which contact the ground are set in approximately equidistant locations from each other providing a balanced and stable structure. Adjusting the ATC is done by sliding the Main Cord Wraps (MCW) down along and around the AP. As the MC is tied to each end of the SP and wrapped around the AP at the MCW, movement of the MCW adds or relieves tension put on the SP. The MCW are pulled downward to setup the Cover, and pushed upward to takedown the Cover.

Tensioning the MC also creates the ATC's dome shape by pulling both ends of the SP down and inward over the AP, and pulling the AP inward to create an open dome shelter protected on three main sides: the rear, left and right sides of the Cover. The SP, under tensioned cords wrapped around the AP, is under hoop stress and loaded with potential energy. Hoop stress put on both the SP and AP creates a strengthened frame better configured to resist forces of wind loading and heavy precipitation.

Concealment

Aside from weather protection, ATC's are intended and designed to be concealable. A core feature of the ATC is the ability to position oneself in a concealed forward position for extended periods of time, regardless of weather conditions. Whether used for big game hunting, photography, videography or universally recreating outdoors, the ATC is designed to adapt and blend in to the surrounding environment.

ATC Prototype C2P 1.1 at left of center

The ATC is a dual purpose tent which is why it is built for "cover." End users can choose to use their ATC for concealment or as a canopy for protection from weather, or both. Cover canopies are made of either camouflage or solid earth-tone colored fabric. Cover canopies may also be made of fabric or other material that is opaque to infrared light or designed to conceal a user's heat signature.

Ripstop nylon is used to make Cover canopies due to nylon's lightweight and high-strength properties. With nylon being one of the strongest man-made materials it is ideally suited for use as a weatherproofing canopy. The Ripstop nylon fabric is coated on one or both sides with a polyurethane or silicone coating. All Cover canopy seams are sealed with either polyurethane or silicone seam sealants. The Main Cord (MC) as well as the Ground Cord (GC) are made of seven-strand nylon Paracord that is 550lb. test.

Using the All Terrain Cover

ATC's are purpose-built concealable shelters developed to be highly portable, extremely lightweight, and have an inherently fast and intuitive setup process. To accomplish this, the Cover is an assembly as opposed to needing to be assembled; meaning, the Cover is one (1) integrated system and does not need

to be put together in the field, like a typical tent would. Each Cover is capable of free-standing upright on rocks, tundra ground, on the side of a mountain or in the brush.

ATC's are simply unraveled; shock-corded pole sections for the AP and SP are connected; Ground Cord (GC) is connected to both ends of the AP; Intersection Knot (IK) is set; both MCW's are pulled downward to designated locations; Symmetry Knots (SK) are moved to contact position on the AP, and the Cover is pitched. Users may need to re-set or adjust location of IK along AP to compensate for varying terrain gradients. Users then fasten all three ends of the Cover fly to each end of the AP and the rear end of the SP, and tighten the Cover fly taught.

Prototype ATCS1.3 pitched on uneven terrain. Designed for the Solo adventurist, an ATC'S' can comfortably cover two occupants.

Specifications:

Peak Height	46"
Coverage	32 sq./ft.
Weight	1:14.0 lb:oz

All Terrain Cover Six (6) step setup process:

1. Connect pole sections of SP first and then connect sections of AP.
2. Connect Ground Cord (GC),
3. Set Intersection Knot (IK),
4. Pull Main Cord Wraps (MCW) downward to the appropriate location,
5. Move Symmetry Knots (SK) to AP,
6. Check/Re-set location of IK if necessary.

All Terrain Cover Three (3) step takedown process:

1. Unfasten Cover canopy from poles ends,
2. Push MCW's upward to the middle gold section of AP,
3. Breakdown AP first and wrap bundle of AP sections with the GC, then breakdown SP sections and roll up Cover.

To facilitate setting up a Cover in the future it helps to takedown and roll up the Cover in an organized fashion. Following the takedown process allows for a simple setup process; most importantly, following step #3, bundling and wrapping the AP sections with the GC which separates the AP and SP sections when broken down and held together.

After the ATC frame is setup and put under tension three or more ends of the Cover canopy are connected to the tips of the poles, as shown in **Figure 4**. A grommet with adjustable strap is connected to the pole end tips and is used to fasten and tighten the canopy to the ATC frame. The Cover canopy can be configured for concealment, wind or coverage, and each side of the canopy can be configured independently. This allows the Cover to adapt to ground features, uneven terrain, or user objective. Weatherproof fabric is used as a Cover canopy by way of cutting and sewing the fabric in a shape that maximizes coverage and minimizes drag, as well as vent off excessive frontal wind loading thru the rear end of the ATC.

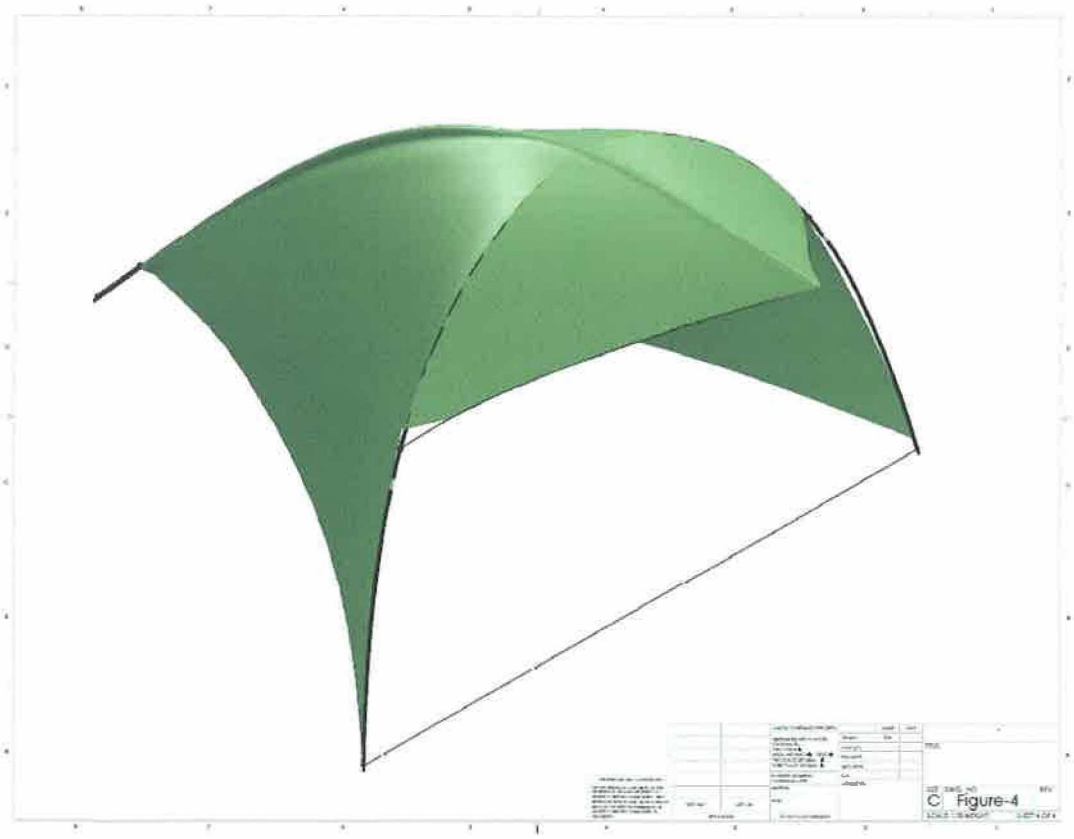

Figure 4: Isometric view of ATC frame with Cover Canopy

The Cover is a freestanding shelter as it can stand upright without any type of support. Although, in the outdoors there is always wind and therefore for optimal performance ATC's should be fastened to the ground. Up to seven (7) guy-line stakeout points fasten ATC's to the Earth. Four (4) main stakeout points to include two (2) stakeout points on each end of the AP and two (2) rear main stakeout points along the bottom of the cover canopy between the two ends of the AP and the rear end of the SP. These four (4) main stakeout points are recommended at all times to secure and stabilize the ATC in light to moderate weather conditions.

Figure 6: ATC Prototype C2P 1.2 in Wind configuration

Depending on wind conditions, and Cover configuration, up to three (3) additional guy lines increasingly secure and stabilize the ATC in severe rain, light-medium snow, and up to Moderate Gale wind forces. These three guy lines are located on both sides of the AP, as delineated by the SP, and on the outside of the Cover canopy on the SP in the rear of the ATC. All stakeout points are designed to accept stakes, rocks, logs, brush, or anything else the user can wrap a guy line around or tie a guy line off to.

Cover configuration is up to the user and available terrain features. Either side of the ATC can be configured independently. For example as shown in **Figure 6**, one (1) or both sides of the ATC can be "winged out," or pulled outward for a variety of reasons. Mainly, one (1) or two (2) sides of the ATC can be pulled outward to provide more coverage and keep more gear or occupants out of the weather.

In higher wind conditions, pulling the bottom of the Cover canopy out on the windward side decreases the angle of attack at which wind contacts the ATC. As such, the ATC can shed higher winds by lowering the angle at which wind contacts the Cover canopy decreasing the amount of drag produced by the ATC structure. ATC's are aerodynamically shaped specifically to cut through and vent off wind loads and gusting from all angles. The ATC canopy is pulled outward by running wind guy lines thru the hardware on the end of the canopy wing, staking the guy line into the ground or looping it around an object, and tightening as necessary.

The extended canopy overhang on the front of each ATC provides the user with rain protection for video or camera equipment, optics, rifles, or personal comfort. The Cover canopy has "wings" on either side which fasten around each end of the AP with hardware and an adjustable strap. The rear end of the Cover canopy is triangular in shape and is fastened to the rear end of the SP with hardware and an adjustable strap. The Cover's canopy is also adjustable adapting as necessary to various terrain conditions, brush or other features, while allowing the user to choose from concealment, coverage, or wind canopy configurations.

ATC prototype C2P1.1: shown at right in Coverage canopy configuration.

Specifications:

Peak Height	60″
Coverage	42 sq./ft.
Weight	2:13.0 lb:oz

ATC's Performance Specification

The All Terrain Cover concept is designed to meet certain performance specifications, or user requirements, such as durability, adaptability, and ease of use. The ATC is capable of being pitched in remote locations, backcountry, in the mountains or right in camp. This invention is most likely to be used by outdoor enthusiasts or those who go afield regardless of weather conditions. Many of these end users have strict ultra-lightweight standards for gear. As such, the ATC is designed to a "one man-pound" requirement; meaning, the Cover provides coverage for more occupants than the Cover weighs in pounds. "Elevation Series" (ES)ATC's can comfortably cover two occupants and weigh 1lb. 3oz., well under the one man-pound requirement.

The ATC's intended purpose is to provide weatherproof protection quickly and easily, in any terrain environment where an individual may encounter rain, wind, snow and/or sun. As many of the finest outdoor locations are out in the open, within a forest, in the brush or on top of a mountain, the ATC is a stable and durable solution to meet the need for immediate cover in tundra, boreal, and rocky environments.

Prototype ESATC1.2 in Brooks Range, Alaska. ESATC's are the lightest and strongest Cover's made. Constructed of carbon fiber poles and 30D silnylon, ESATC's provide ultra-lightweight coverage for two.

Specifications:

Peak Height	48 inches
Coverage	36 sq./ft.
Weight	1lb. 3oz.

ATC's are designed to remain stable and secure withstanding weather conditions typical of Summer and Fall seasons in Alaska and the Pacific Northwest. Although the ATC is not a hurricane barrier, or high-wind break, each ATC is rated to withstand Moderate Gale wind forces. ATC's should be properly oriented according to wind direction, with windward rear and rear angled sides of the ATC taking the direct wind pressure. It must be noted that stability of the ATC is dependent on the proficiency of securing all necessary stakeout points. All seven (7) stakeout points must be fastened to suitable and firm soils, cobble sized rock, brush or other features securely for the ATC to withstand rated wind forces.

Research, Development, Conditions Use Testing

Initial Project research focused on finding similar shelter products available on the retail market. The purpose of this market research was to determine if a Cover type product idea had already been invented, and specifically whether a similar product was patented. Even more pertinent, this research was simply aimed at finding an existing shelter product that could meet the needs of being adjustable, lightweight, concealable and relatively strong. To this day the PM has not found a similar product or any type of adjustable tent of like kind on the retail market.

The major portion of I to I Project's research was conducting a patent search. Prior to searching patents a strategy was established to search patents efficiently. Throughout the Project duration information was uncovered and elaborated. The Project benefited from being flexible and amenable to change as more effective methods of meeting objectives were identified as the work progressed; and, Idea to Invention adapted as designed to change and seek to capitalize on this information.

A prime example was a change in the sequence of key work activities that were defined by the Idea to Invention's critical success factors. A majority of the Project's patent research concluded that inventors should ensure their idea isn't already patented, prior to marketing and seeking to patent the invention.

Prototyping

To fully define the ATC's function prototypes were built, tested, and improved continuously throughout the Project. Initially, a scaled down version of the ATC concept was built to see how well the conceptual shape would handle wind loading. Smaller prototypes allowed for the Primary Inventor (PI) to more easily design the fabric canopy, and also analyze how the canopy, when fastened to the poles, would interact with the frame during the setup and takedown process. There was no set design; rather, the Cover had to meet the performance specification of being easily setup. This meant that the ATC would have to be an integrated system, or an assembly, as opposed to being made of separate parts that require assembly in the field.

The first three ATC prototypes were built in 90 days and in the field undergoing initial testing by December 2013 in Alaska and in Oregon. These first-run prototypes were the result of extensive indoor frame and canopy analysis. At first the Cover's canopy only came halfway down each side of the ATC and was fastened to the Main Cord (MC). The canopy design evolved significantly to a full coverage configuration. This change allowed for the three ends of the Cover canopy to be fastened to the three pole structural base, which strengthened the canopy and frame assembly significantly.

A critical performance requirement was that the ATC would be quickly and easily setup, as well as taken down. Building the Cover as a single system with poles, cord, guy lines, straps and a canopy that didn't get entangled during setup was a challenge and of the "design issues." Throughout prototyping numerous

function related issues arose that disallowed the Cover to work as envisioned. Many solutions, additions or slight modifications were made to the ATC assembly to aid in functionality and ease of use. Also, elements of "Poke Yoke" were added to the design to prohibit users from setting up the Cover improperly.

Prototyping and indoor analysis can only tell an Inventor so much about an invention made for the outdoors. Once the ATCs worked properly they were put in the field for performance testing. Repetitive setup and takedown cycles were conducted on various types of terrain to see how easily the Cover adjusted to uneven ground. Non-suspecting users were asked to takedown a Cover that was setup to see if the Covers were susceptible to entanglement if taken down improperly. Finally, ATCs were used on multiple backcountry expeditions and tested for overall utility, strength and durability.

Field testing the ATC validated the invention's utility and functionality. On each backcountry field test ATCs were deployed every day for a total of twenty-two (22) days, allowing for performance analysis in sunny, snowy, rainy and windy weather. Multiple prototypes were tested on each trip; and, one of the prototypes would always be setup in one location for the duration of the trip. The 'camp Cover' endured the compounded effects of every weather condition encountered during the trip. Would ATC's stretch, sag, collapse, or weaken if pitched outdoors for a week straight? Would repetitive warm/cold wet/dry daily cycles affect the Cover's integrity? Would it be difficult for someone with little knowledge of the ATC take one into the field and use it easily?

The answer "yes" to these questions was not an acceptable answer, as the invention would fail to meet performance specification. So the Covers were put to the test, enhanced, and improved until the invention became a highly utilizable, durable and easy to use.

Testing and Enhancement

Conditions use testing took place in the Chugach and Brooks Range Mountains, central Alaskan tundra, and Anchorage, AK. The project began exposing Cover prototypes to weather in Anchorage, as this helped to conduct various types of testing quickly and for longer periods of time. Prototype ATCS1.2 was exposed to the weather for ninety-two (92) continuous days from April to July 2013.

A majority of the initial prototyping effort was focused on fitting a Cover canopy so that it would remain taught in various configurations. Additionally, the Cover canopy had to be capable of shedding up to Near Gale winds as measured on the Beaufort scale, as well as sustained rain and snow. The Anchorage testing site is exposed to the Southwest allowing for ample "Chugach Wind" testing opportunities. Cover prototypes were left pitched at the site for days, weeks and months at a time. Prototypes were reconfigured, relocated and repositioned frequently to analyze the effects of wind loads on every angle of the ATC frame.

Necessary enhancements to the ATC design were noted during weather testing in Anchorage, as well as during the Brooks Range wind testing activity. Prototype ATCS1.2 showed signs of stress on the MC at the Tip End Loop (TEL), and was subsequently modified to relieve stress at this point. While taking high winds from the rear, one of the two ESATC prototypes showed a weakness at the rear of the Spline Pole (SP). An additional guy line point was added to the ATC at this location of the SP to prohibit the SP from flexing excessively and contacting the user. The location of the Intersection Knot (IK) was moved slightly rearward. The first prototypes had a tendency to tip forward as the majority of the Cover's

weight was too far forward as measured over the pole base. This configuration made the Covers taller at the peak, although this came with increased instability. The IK was moved rearward so the ATC would "sit back" which provided a much more stable shelter platform.

The majority of the product enhancements were added to make the Cover easier to use. Visual markers were added to the SP and Arch Pole (AP). Markers help the user see where to set the IK, as well as the MCW, so that the ATC could be pitched more quickly and more easily placed in a symmetrical position. Velcro stops were added to the SP and AP so that users could not accidentally unwrap the ATC's MCW, as this would disassemble the ATC assembly and likely cause a loss of functionality. Finally, the IK was tied in a fashion that disallowed the pole assembly from being rotated clockwise during setup, and only allowed the pole assembly to be rotated counterclockwise which is necessary to keep the MC from entanglement.

Active Risk and Opportunity Management

Project Risk Management was defined early in the planning phase and continuously updated to release contingency and also to identify more current and pertinent risks. The Idea to Invention project maintains a list of risks and opportunities in the Risk Register. Identifiable risks were incorporated into the project schedule which was estimated to account for unknown risk events that may affect work activities. The PM "actively" sought out new opportunities as well as unidentified risks constantly to capitalize on newfound information, as well as try and stay ahead of potential problems. At this time none of the identified risks have occurred; rather, the Project has uncovered more opportunities than it can enhance given the short project duration. For this reason, opportunities had to be prioritized to determine which could provide the most benefit to the Project, in terms of meeting the Project objectives faster.

A key component in the Project's opportunity enhancement strategy was to exploit each activity to the most extent feasible. This meant that while conditions testing the ATCs, video and photos were taken of the Cover's being used for their intended purpose for marketing. Also during this time users were able to benefit from value provided by the Cover prototypes, and with little convincing were persuaded to possibly purchase an ATC. In fact, throughout research, development and conditions use testing four (4) ATC were ordered by users.

Risks that could affect the Project were initially identified, documented and continuously maintained in the Risk Register. Effects of these risks were outlined and put thru qualitative analysis, and the most significant risks were then analyzed to quantify the time and cost implications to the Project if each risk were to occur. These significant risks were then planned for with contingency, a corrective action activity, or simply an expectation that the risk would occur. The Idea to Invention Active Risk Management Plan, Risk Register, and Probability and Impact Assessment documents are included in the PMP.

Quality Management in Delivering a Marketable Product

The goal for many inventors is to someday profit from a patented invention. For this to occur the invention must work properly, be easy to use, and meet other basic user requirements. Ideally the invention would meet all user requirements, as well as deliver more value than the invented product costs.

Core requirements for the ATC to meet consisted of the following:

- Easy to setup and takedown,
- Lightweight and portable; ATC when collapsed takes up minimal volume,
- Does not need to be assembled,
- Can be adaptable to different types of terrain i.e. rocks, tussocks, uneven ground,
- Can be left outdoors for up to 30 days,
- Shaped so as to shed rain, wind and snow, as well as provide ample UV cover,
- Strong enough to withstand up to 38mph winds,
- Blends in to the surrounding terrain,
- Function properly every time when used.

The Idea to Invention project took a value-focused approach to managing the quality of ATC products, while using Value Metrics to measure the Project's overall performance. ATCs have to create value for the user if the invention is to be marketable. The Project needs to execute the work effectively and timely to create value for the Project Sponsor, as well as all Key Stakeholders. Idea to Invention was designed to learn a high-performance method for delivering a shelter than conformed to as many user requirements as possible; and, creating work activities to meet stated requirements. Quality and Scope Management efforts are interrelated and synergize throughout the project duration. The Project capitalized on this synergy and delivered an original and marketable product that has shown measurable amounts of consumer demand.

PM Based Patent Search Processes and Strategy

Idea to Invention had a low tolerance for the risk effects associated with patent infringement. Therefore, the project spent a considerable amount of time researching existing patent claims that were associated with all of the components, as well as the ATC tent itself, that were similar in function. The scope of the invention had to be clearly defined to provide a usable patent search criterion. The PI must decide how the invention will function and provide utility. This function of the invention, how it works and how someone uses it, is critical to articulate in as many ways as possible to begin the patent search. In this phase keywords are used to describe the invention's function, parameters of design features, and describe what utility the invention provides for users. All aspects of the invention need to be defined and searched against patent databases to ensure similar patent claims do not exist.

To begin the inventor must clearly provide detailed information regarding the following questions:

- How exactly does the invention function?
- What differentiates the invention's look and function from all other existing design and utility patents?
- How much of the invention is patentable, any or all?

A Project goal was to plan and manage the patent search activities for efficiency as project priorities constrained the schedule. Multiple coordinated methods for searching patents were used first to isolate related patent class and sub-classifications. Approximately sixty-five thousand (65,000) patents were captured during the strategic patent search. The "Tent" classification (Class 135) contained a majority of related sub classifications although other components of the ATC could be considered highly similar to

other forms of existing prior art. Significant components such as the Intersection Knot, Main Cord Wrap, and overall look and design of the ATC had to be defined and subsequently searched to see if similar working components had already been patented. Once all related patent sub-classifications were identified the PM was able to search thru many patents very quickly by first reviewing the drawings, and then if necessary reading the technical description of the invention.

Of course determining patentability is likely the most challenging activity in the patent process. The Idea to Invention project learned thru patent research that there are many ways to get from idea to invention to patent filing. Traditional literature regarding the invention to patent process recommends that an exhaustive patent search be completed prior to any other work. This is because if the invention has already been patented the inventor would be wasting their time pursuing a patent on an invention that is not original. Although, the Project learned that patent searches are never really complete. When an inventor finishes the exhaustive work required to search thru 7+ million patents in the USPTO database they can begin searching patents at the European Patent Office, then the Russian Patent Office, and then perhaps the Singaporean Patent Office. This list extends to an additional 50 patent offices across the world, and these are just the patent databases available on the internet.

A Primary Inventor (PI) needs to determine at what point the invention appears to be "original." Too much time can be spent searching patents which directly takes time away from the work required to deliver an invention to market. For this reason, the Project Manager must define parameters for the patent search, as well as accept a certain level of risk tolerance in terms of infringing on existing patents. After completing a preliminary patent search to include a keyword and semantic search; and a strategic search encompassing the review of a majority of patents within the sub-classifications the PM was comfortable moving forward with the project. Determining patentability is important although not as important as achieving project objectives such as completing an invention assessment to measure consumer demand.

Invention Assessment for All Terrain Cover Concept

As stated above the USPTO estimates that 1-3% of patented inventions produce profits for the inventor ((USPTO), 2014). One clear certainty when seeking to patent an invention is that the patent process is expensive and time consuming. It makes sense to test the marketability of an invention product prior to going thru the year's long and costly process of obtaining a patent. Testing market demand can be done in many ways, and one way is referred to as an invention assessment. An invention assessment seeks to provide useful and current information related to the following product related requirements:

The invention:

1. Can fulfill a consumer's needs or desires,
2. Can be manufactured and sold at the right price, sold at no more than five times what it costs to make,
3. Can be delivered to market, a way to distribute your product is in place and the market opportunity is established,
4. Can pass safety, legal, environmental and performance expectations or standards.

Before an invention assessment can take place the Project recommends prototyping to reduce to practice the best mode of the invention. The most basic consumer need is for the invented product to work properly every time it is used. Determining the invention is completely functional and capable of

repetitive use without becoming non-functional can only be done thru prototyping the invention, and subsequently testing its performance. Once the invention is prototyped and proven to work properly every time it can be considered "market ready", which is an opportune time to assess the invention's market viability.

The Idea to Invention project learned effective methods of marketing the ATC during the execution phase. Initially ATCs were going to be placed in the public locations in a passive effort to expose Covers to the market. As the Project progressed it became apparent that a faster and more aggressive method of marketing was needed to meet Project objectives with given schedule constraints.

Idea to Invention approved the most significant change midway thru the project that came from an opportunity, and added time and work to the already constrained project schedule. The change included developing a five-minute marketing commercial, and creating a sub-project to sell ATC's thru an online crowdfunding forum. This change represents the Project's invention assessment and is currently being used to test consumer demand for the ATC; and, quantify the amount of future demand for the ATC. This changed added a more aggressive invention assessment method to the Project scope, and with it came additional risk and opportunities that were analyzed and presumed to be advantageous to meeting project objectives.

Conclusion and Recommendations

Moderate consumer demand was measured during the Test Market Response activity, as represented by the PM receiving orders for ten (10) All Terrain Covers over a twenty-five (25) day duration. A main project objective was to sell five (5) ATCs. It shall be noted the ESATC which is the lightest, strongest and most expensive Cover was shown to be in the highest demand. The Idea to Invention Project concluded that the ATC has proven to be a marketable product invention. Additionally, the Project concluded that current price points are high enough to suppress excessive demand.

The Idea to Invention Risk Management Plan evolved as the Project gathered information and better understood the PPA filing and invention assessment processes. The Project concluded that determining the ATC's marketability was a higher priority than the determining the ATC's patentability. As such, the Project recommends that an inventor draft and file a PPA prior to expending significant resources searching patents. It is logical for a profit-seeking inventor to ensure there is measurable consumer demand before they begin investing in a professional patent search, or patent filing.

Inventions typically have one or more key components that can be claimed in a patent filing. The ATC has five (5) significant components that differentiate it from all reviewed patent claims. It is probable that certain aspects of the ATC could be determined non-patentable. However, it is highly improbable that every aspect of the ATC is already patented. It is highly likely that something about the ATC's function and method of operation is in fact original. And since the invention assessment concluded positively regarding the ATC's marketability it is recommended that the PM pursue filing a non-provisional patent application.

Lessons Learned

The Project learned early on that there simply wasn't enough time to include everything in terms of project scope; some activities had durations that could not be controlled, other activities were related to the work but could not be included in the Project. Being a product related project the PI realized that delivering a product, a physical shelter that actually worked as intended, was going to take a lot more time than initially planned. Also, since the PI has limited experience in new product development, the project was designed to actively manage change as it was highly probably change would occur during execution.

Idea to Invention learned that certain project requirements may not be achievable. If the PI's "idea" is already patented, and changes to maintain originality are constrained by the PIs available resources, the project may not deliver an original product. In this case, the Project does not meet the primary objective of securing first to invent rights to a patent, although the Project has screened out the idea. The Project worked; there is evidence for not expending further resources on trying to patent a product idea that is not original. So instead of basing project success on completing some overarching objective of achieving product patentability and marketability, project success is based on how well the invention assessment and patent search activities perform in validating, or eliminating, the idea.

Patent claims may be made initially by filing a PPA which establishes a priority date for the claim(s). A primary advantage to filing a PPA is the protection afforded by establishing an "effective filing date," which can protect the inventor's IP and more safely allow the invention to be exposed to the public for the purposes of conducting an invention assessment. A lesson learned related to filing a PPA is to do it early after prototyping the invention. There were no compelling reasons found throughout the research to conduct an extensive patent search prior to filing a PPA. The Project learned and recommends the advantages of filing a PPA early in an invention project to more quickly reach target market users and execute the invention assessment.

A significant project risk was the effect of losing potential future revenue from a competitor stealing and selling an ATC like product. However, throughout the project duration information on patent infringement was researched and scenarios for this risk effect were evaluated. Through research the PM quantified the probability of a patent infringement event as low to very low. If infringement were to occur, the timing of a Demand Letter or Cease and Desist Order would come long after the Project was completed; therefore, risk tolerance for the effects of patent infringement increased to the point where the Project simply accepted this risk.

This insight changed the approach to the work significantly as the patent search work took a lower priority to the invention assessment. After the prototyping and improvements were made Project value could be created faster by expediting the ATC to market. Patent related research supported an interesting concept: instead of drawing conclusions from a comprehensive patent search first, before filing a PPA, the inventor could file the PPA first to protect the idea and market it (Smith, 2009). The idea here was that if an inventor truly developed the invention on their own, and could detail and explain the invention with enough specificity for a peer to easily understand how the invention was built and operated, that something within all the invention claims would in fact be patentable.

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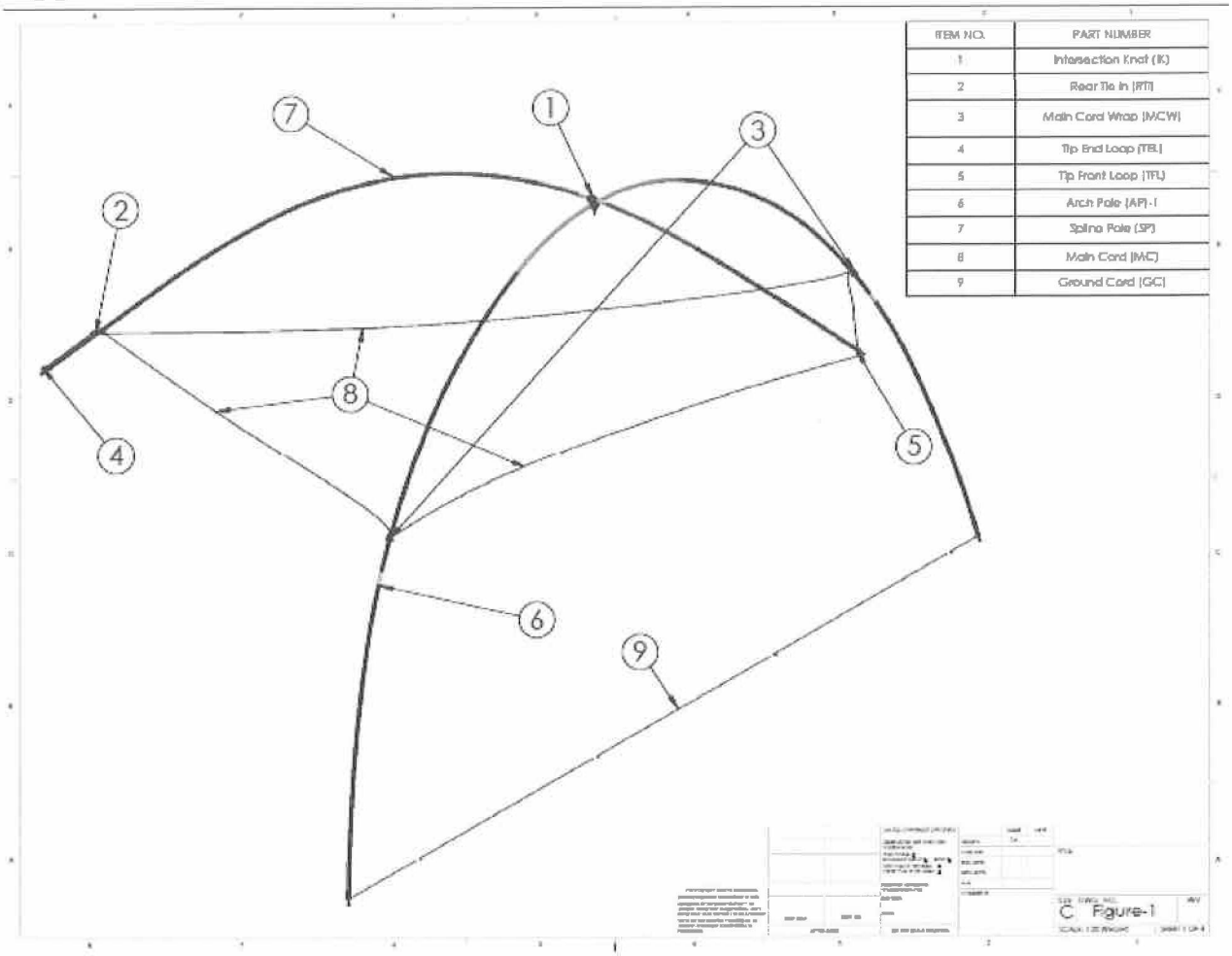
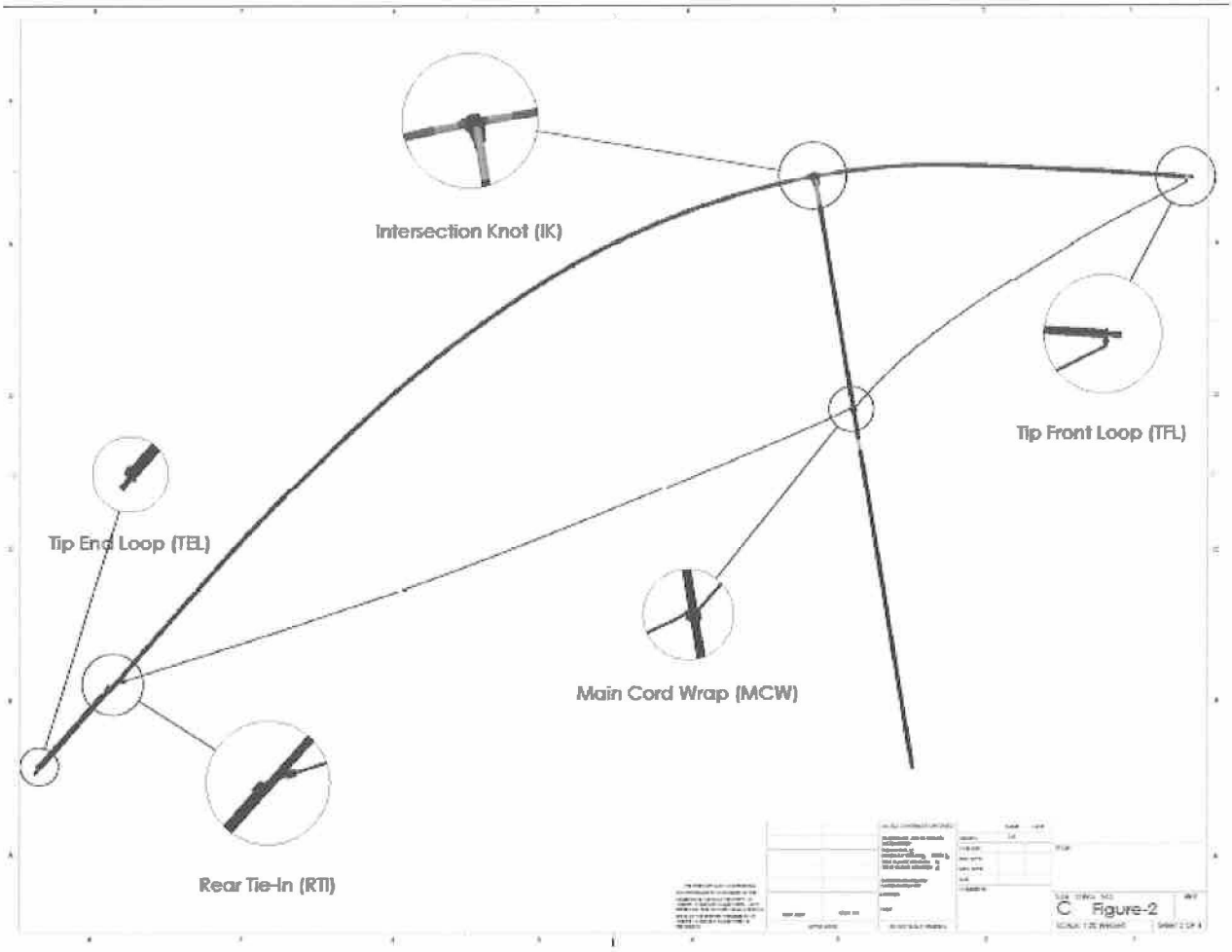
Appendix A, ATC Drawings



Appendix A, ATC Drawings



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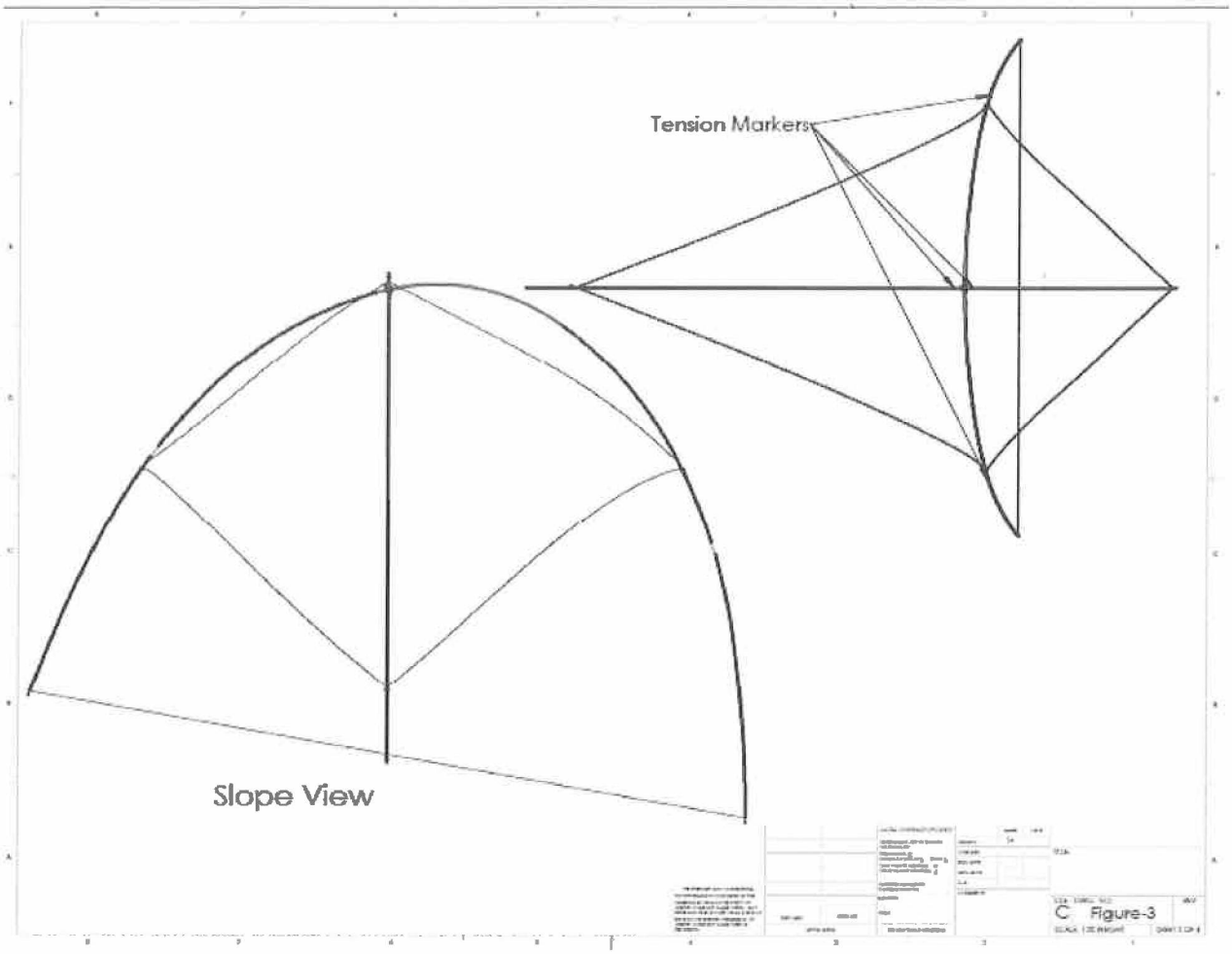
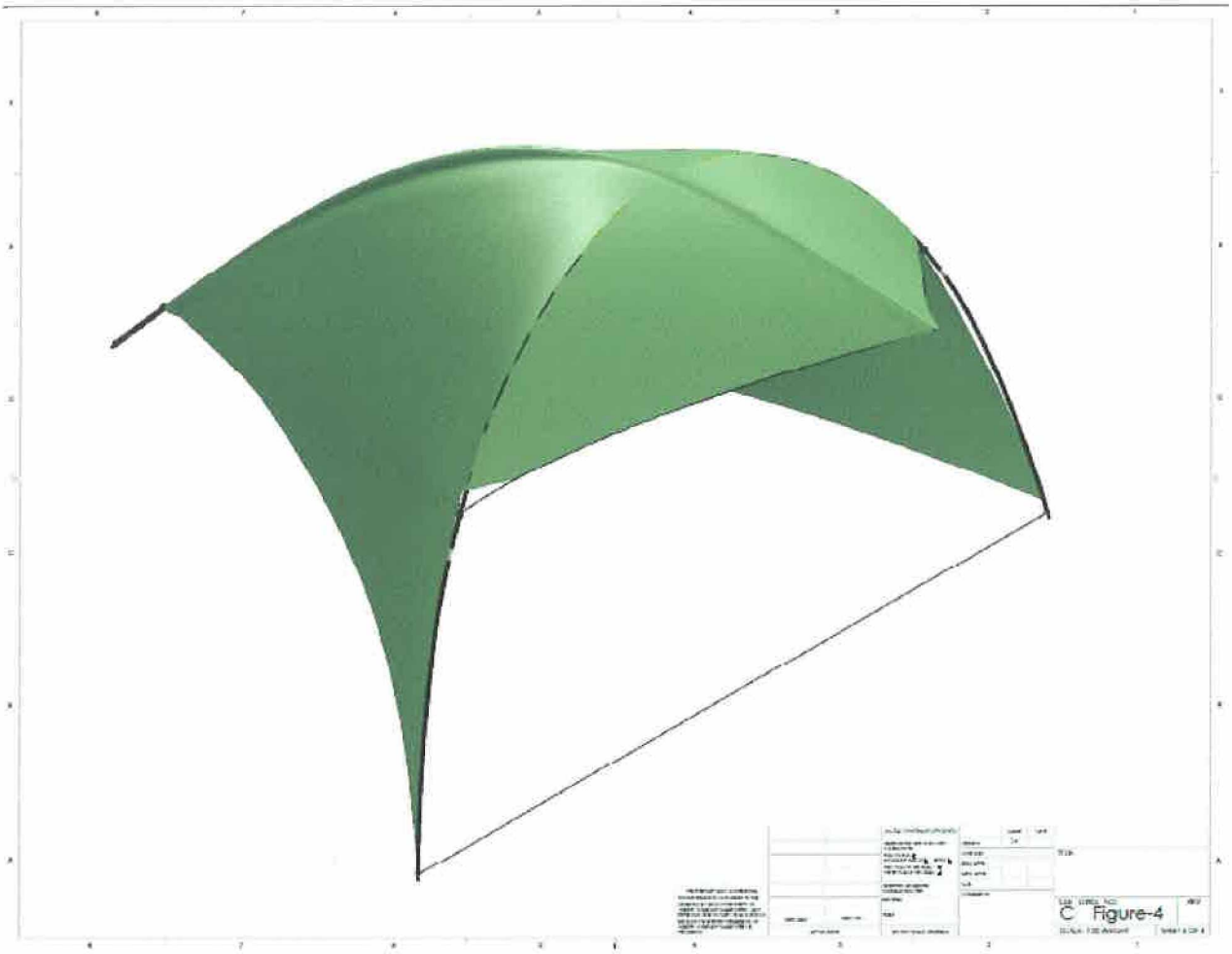


Appendix A, ATC Drawings



Appendix B, Provisional Patent Application (PPA)

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET NO	TOT CLAIMS	IND CLAIMS
62/068,211	10/24/2014		65			

CONFIRMATION NO. 9278

Daniel G. Aicher Jr.
610 Maywood Circle
Anchorage, AK 99515

FILING RECEIPT

OC00000071738373

Date Mailed: 11/06/2014

Receipt is acknowledged of this provisional patent application. It will not be examined for patentability and will become abandoned not later than twelve months after its filing date. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Daniel Gerard Aicher JR., Anchorage, AK;

Applicant(s)

Daniel Gerard Aicher JR., Anchorage, AK;

Power of Attorney: None

If Required, Foreign Filing License Granted: 11/06/2014

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 62/068,211**

Projected Publication Date: None, application is not eligible for pre-grant publication

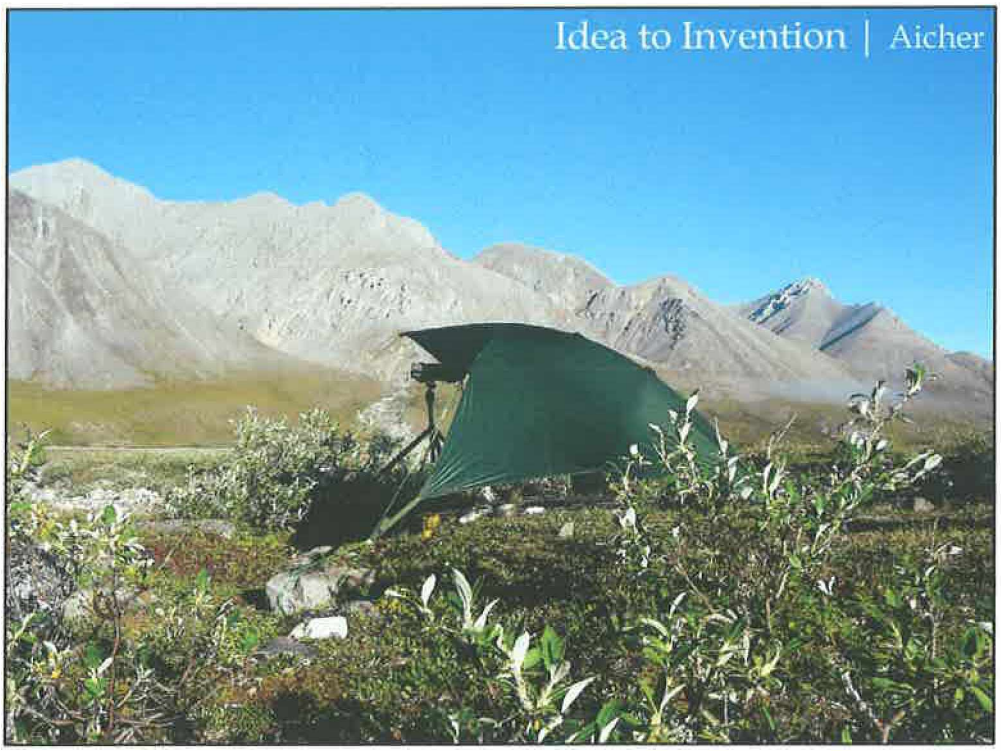
Non-Publication Request: No

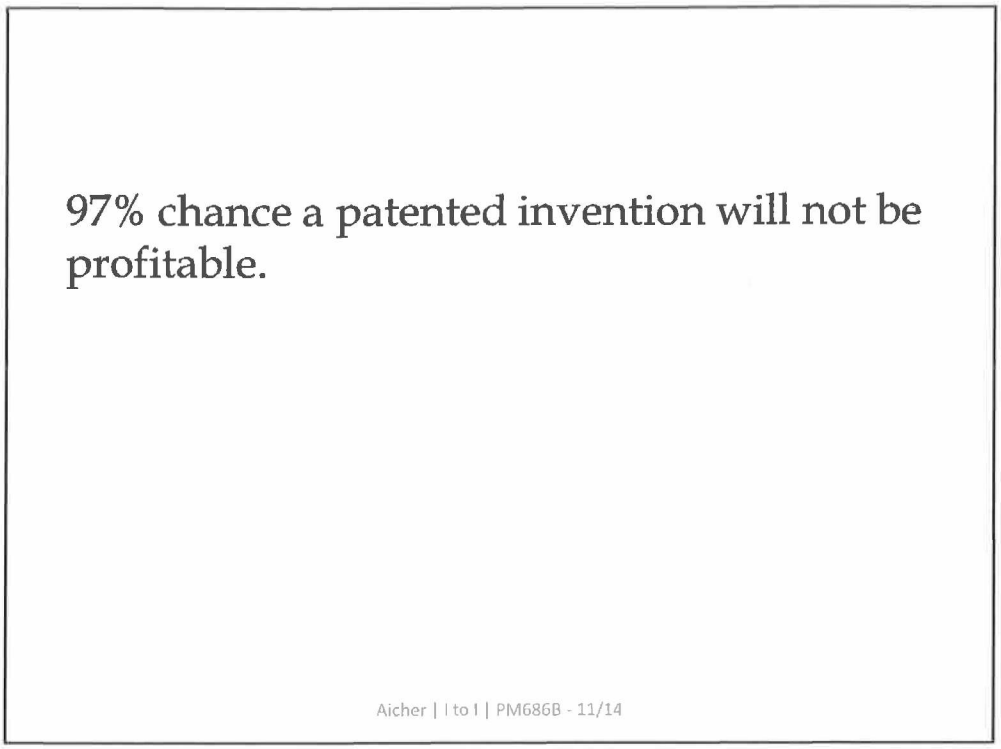
Early Publication Request: No

**** MICRO ENTITY ****

Title

Adjustable Tent; All Terrain Cover

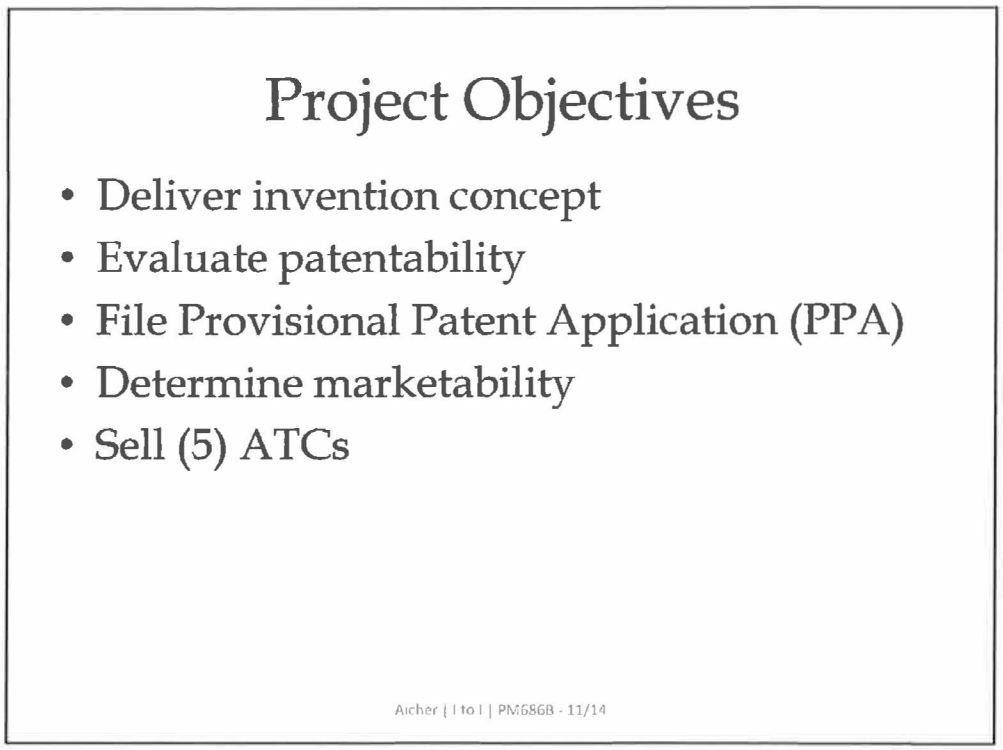

Idea to Invention | Aicher



The Good News: A patented invention has a 3% chance of making money, at best.
-Patent Process; filing and examination fees on average cost $4k, process takes on average 4 years
-Does not include the cost of prototyping or R&D costs; value of time spent.

Inventor's Objective:
-Business,
-Personal,
-Profit Seeking,
-Likely a combination

ATC Project (aka Idea to Invention)
-Personal Funds expended ~$2,600
- (6) Prototypes
- Inventory (11) Covers worth ~$1,400



Design, Build, Test, Improve ATC
-Proven functionality in the field,
-Meets a need; provides a solution, utility, usefulness.

Evaluate Patentability
-Extremely difficult to determine patentability,
-Research Patents and draw a conclusion on patentability.

PPA
-Establishes first to invent rights to the ATC's function and method of operation,
-12 month pendency period; must be specifically referenced in NP Application; or, can be converted via petition in a NP Application filing.

Marketability
-Invention Assessment,
-Field Demos, Prototyping while marketing,
-Develop effective method of measuring demand.

Idea

- Is it worth your time?
- How much demand could there be for this idea?

Has it been done before…?

How much time is this going to take?
-Is it feasible, constructible, doable within an Inventor's constraints?

Demand
-The idea was for the project to learn effective ways of measuring consumer demand
-Is there a market?
-Is there really a need?
-Price Point, is everything

Originality is a Project Requirement.

Invention

- Reduced to Practice
- Does it work, every time, like it is supposed to?
- Keep quiet, but not silent
- Now what?

Reduced to Practice
-What shape will it have?
-How will the parts fit together?
-What are the features; and, how does it function?
-How will someone operate it?

How well does the invention work as intended?
-Repetitive use, conditions use
-Use cause it to become non-functional?

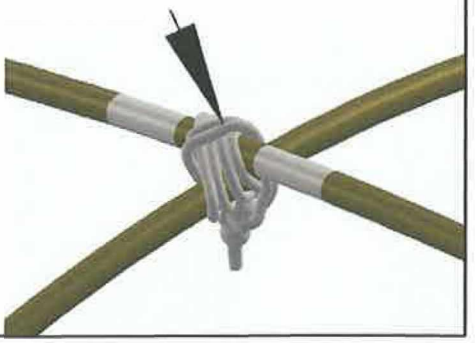
Talk about it – expose the invention within reasonable limits
- Non disclosure agreements (NDA)
- Allow users to use invention
- "Observe" and acquire feedback
- Discuss how to penetrate the market to clarify target markets

- Put the invention to use and record its performance.

R&D

Prototyping

- Feasibility and Constructability
- Change Management
- Utility
- Is there a better way?



Archer | I to I | PM686B - 11/14

The most challenging and time consuming activity.

Can it be done with available resources?
-Plan materials supply chain,
-Define prelim design, determine if Inventor can deliver,
-Will the parts conform in an assembly?

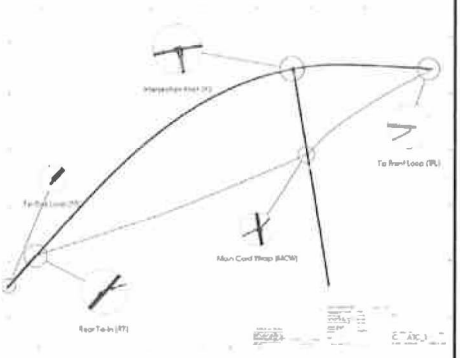
Change is imminent; Change management criteria is required:
Design
-Constant modifications in beginning; solutions to numerous design related issues
-Document why design changes were needed; and, why the final design was accepted

Patent Related
-Patent search activities will likely uncover similar existing "prior art."
-ATC must be unique, original in design, and be "non-obvious."

Prototypes must provide utility; they must work as intended and in the best way possible.

Patent Search

- Preliminary search
  - Multifaceted approach
    - Semantic search
    - Google patents
- Strategic search
  - Class 135: Tent
  - Sub-class
    - 87: Portable Shelter
    - 124: Arch or Dome type



Testing & Improvements

- Measuring performance
- Improve design to meet performance specification

Proving grounds

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY DOCKET NO	TOT CLAIMS	IND CLAIMS
62/068,211	10/24/2014		65			

CONFIRMATION NO. 9278

Daniel G. Aicher Jr.
610 Maywood Circle
Anchorage, AK 99515

FILING RECEIPT

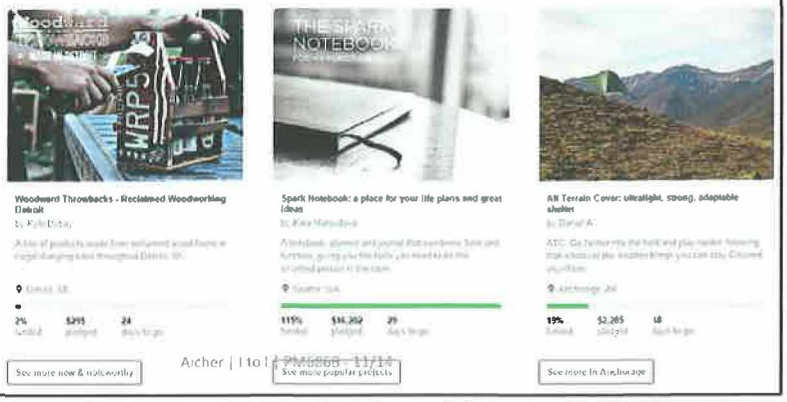
OC000000071738373

Date Mailed: 11/06/2014

- PPA
  - Instruction Manual – peer reviewed
  - Detailed Description
  - Drawings
- Patent Pending – 12 months

Invention Assessment

- Is there a market, and demand?
- Can it be delivered and sold at the right price?

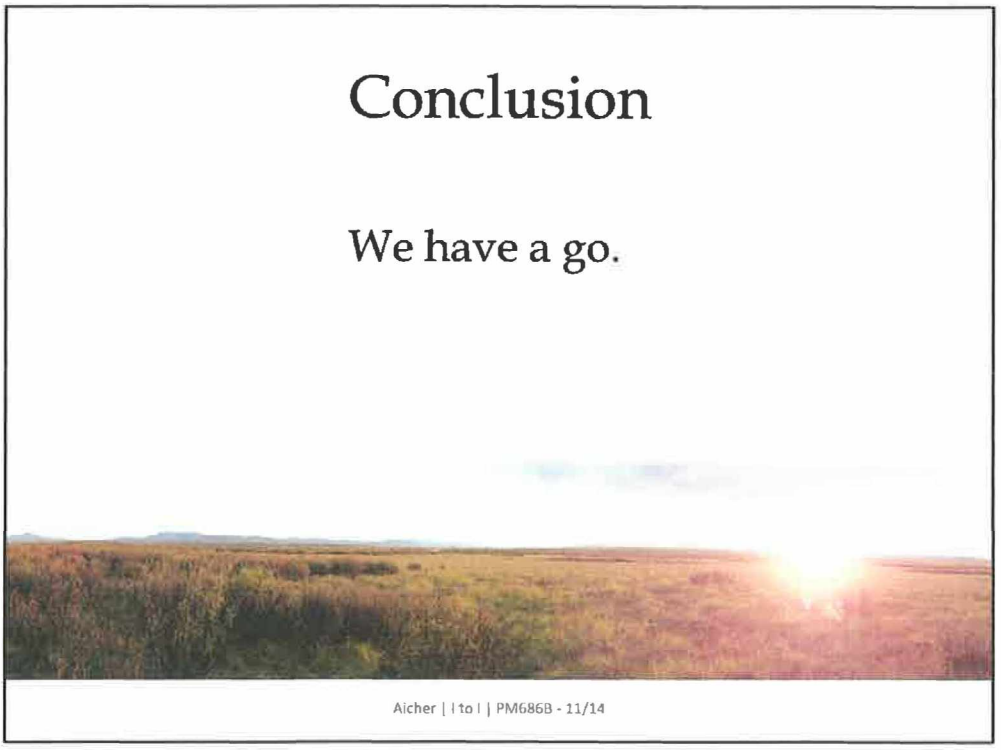


Market research to estimate total amount of potential users in target markets:
-Hunting and Backpacking,
-Canoeing,
-Climbing,
-Fishing,

Are there similar, but not highly similar products available?

Pricing is everything:
- Intangible perceived value is higher when Covers are demonstrated in the field when raining,
- Users who have used Covers vs. Users who have only seen the Cover video
- Willing to pay for a product made in the USA and sold at a premium?
- The best methods of quickly exposing the ATC to the market

Can fulfill a consumer's needs or desires.
Can be manufactured and sold at the right price, sold at no more than five times what it costs to make.
Can be delivered to market, a way to distribute your product is in place and the market opportunity is established.
Can pass safety, legal, environmental and performance expectations or standards.



Main Project Objectives:

Deliver invention concept – complete

Evaluate patentability:
The Project identified **three (3) patent classifications** and **twenty-seven (27) patent sub-classifications**. The PM **reviewed approximately 3,700 non-provisional (NP) patents and 780 NP patent applications**. Three existing patents were found to be similar to the ATC in design and utility although not in function, or method of operation. Upon researching referenced patents cited within these three (3) existing patents, none were found to be highly-similar in design.
File Provisional Patent Application (PPA) - Complete
Determine marketability – Fair
Sell (5) ATCs – The project received orders for nine (9) ATCs within the schedule duration

Recommendation is to continue marketing the ATC brand while continuing the patent search; work towards NP Patent Application and file prior to October 1, 2015

At this time the ATC is receiving measurable demand; and, no other highly similar existing patents have been found.

Lessons Learned

Idea to Invention

The Project learned early on that there simply wasn't enough time to include everything in terms of project scope; some activities had durations that could not be controlled, other activities were related to the work but could not be included in the Project. Being a product related project the PI realized that delivering a product, a physical shelter that actually worked as intended, was going to take a lot more time than initially planned. Also, since the PI has limited experience in new product development, the project was designed to actively manage change as it was highly probably change would occur during execution.

Idea to Invention learned that certain project requirements may not be achievable. If the PI's "idea" is already patented, and changes to maintain originality are constrained by the PIs available resources, the project may not deliver an original product. In this case, the Project does not meet the primary objective of securing first to invent rights to a patent, although the Project has screened out the idea. The Project worked; there is evidence for not expending further resources on trying to patent a product idea that is not original. So instead of basing project success on completing some overarching objective of achieving product patentability and marketability, project success is based on how well the invention assessment and patent search activities perform in validating, or eliminating, the idea.

Patent claims may be made initially by filing a PPA which establishes a priority date for the claim(s). A primary advantage to filing a PPA is the protection afforded by establishing an "effective filing date," which can protect the inventor's IP and more safely allow the invention to be exposed to the public for the purposes of conducting an invention assessment. A lesson learned related to filing a PPA is to do it early after prototyping the invention. There were no compelling reasons found throughout the research to conduct an extensive patent search prior to filing a PPA. The Project learned and recommends the advantages of filing a PPA early in an invention project to more quickly reach target market users and execute the invention assessment.

A significant project risk was the effect of losing potential future revenue from a competitor stealing and selling an ATC like product. However, throughout the project duration information on patent infringement was researched and scenarios for this risk effect were evaluated. Through research the PM quantified the probability of a patent

infringement event as low to very low. If infringement were to occur, the timing of a Demand Letter or Cease and Desist Order would come long after the Project was completed; therefore, risk tolerance for the effects of patent infringement increased to the point where the Project simply accepted this risk.

This insight changed the approach to the work significantly as the patent search work took a lower priority to the invention assessment. After the prototyping and improvements were made Project value could be created faster by expediting the ATC to market. Patent related research supported an interesting concept: instead of drawing conclusions from a comprehensive patent search first, before filing a PPA, the inventor could file the PPA first to protect the idea and market it (Smith, 2009). The idea here was that if an inventor truly developed the invention on their own, and could detail and explain the invention with enough specificity for a peer to easily understand how the invention was built and operated, that something within all the invention claims would in fact be patentable.

PM Applied Knowledge

Idea to Invention

The Project management knowledge areas selected are complimentary and work interdependently as a system's approach to managing the work. Project scope management interacts with both risk and quality management activities throughout the duration. The project planned risk response activities and incorporated them into the project scope of work. It was expected that quality and risk management activities will uncover necessary changes to the product scope of work. Idea to Invention was designed to actively manage changes within the project to incorporate newfound information that facilitates progression towards achieving project objectives.

As of December 3, 2014, all work activities undertaken for the Idea to Invention project were completed. The "Test Market Response" assessed consumer demand as moderate and the PM received orders for ten (10) ten. Project objectives have been achieved and in fact exceeded.

Within a three-week period following the ATC PPA filing the Project had reached over 15,000 people in multiple target markets; 3% of these individuals viewed the ATC Kickstarter page and the marketing commercial has been viewed approximately 1,400 times. A main Project objective was to sell five (5) ATCs by December 3, 2014; at this time ATC project supporters have ordered ten (10) Covers. Information gathered thru Scope and Quality Management activities is available on the ATC website, AlaskaATC Facebook page, and Kickstarter. The Project's work activities took longer to complete than planned, although all activities were completed within the project duration.

The "Test Market Response" activity duration was been reduced from 50 to 25 days. Instead of passively placing shelters in public areas as originally planned, the project has recently published a video commercial to be used as a marketing tool on a crowdfunding website. This approved change was consistent with the change management criteria as stated in the Idea to Invention PMP, and represented the Project's most significant and beneficial change; this activity created the most value for the Project and Primary Inventor.

Quality management activities are complete; field testing, target market exposure, and design improvement activities have occurred satisfactorily. Shelter design was proven and validated by end-users in the field, with extensive internal and external footage of

shelter performance in adverse weather conditions. End user feedback has been received and has been focused mainly on the setup process, as well possibly increasing coverage for additional occupants.

Quality is a critical characteristic in a marketable consumer product, and delivering a marketable product is a main objective of undertaking the work. Quality requirements dictated the entire scope of the Idea to Invention project and performance was measured upon how well the Project conformed to requirements, as well as how much value the ATC provided to end users. The Project assumed that creating value for end-users would have a causal effect on meeting their requirements, specifically more tangible and intangible value than the Cover's cost. Of course functional and basic quality requirements as well as Poke Yoke features were designed into the ATC manufacturing process. Throughout the project duration Quality Management complimented Scope Management by employing Value Metrics, which provided project information for the PM to use for managing changes to the work and validating deliverables.

The Submit PPA activity was complete which allowed ATC Company to go public with the product design. The Project understands there is residual risk associated with exposing the ATC design even though a PPA has been filed. There is a chance competitors could still use or modify the ATC design slightly to get around the protections of a weak PPA. A "high quality" or "really useful" patent is of course important in the end, although the time and resources necessary to develop an extraordinarily useful PPA are outside the objectives of this project. More time could have been spent on expanding the PPA although with a constrained schedule the Project must move on and complete the next work activities.

The following Project Management Knowledge Areas are currently being applied to the Idea to Invention Project:

Project Scope Management

Project scope management was chosen as it is ideally suited for defining and sequencing the work, managing change, and controlling activities required to develop a marketable invention concept. Scope management was used heavily to collect requirements and manage the work to develop an attractive video commercial as a part of the changed Test Market Response activity. Risk management uncovered this opportunity and the change control process providing a way of evaluating and effecting changes to the Project. This decision was made quickly and easily with the predetermined change control criteria. Work was then planned and activated in the

project schedule, although an inactive task with a similar objective was already preplanned. Idea to Invention knew opportunities would arise and was ready with a plan when they did.

Scope Management techniques have been applied to accurately define each and every required work activity. During concept development the Inventor determines functional and/or performance attributes of the product, each of which requiring additional work activities and resources to deliver. The scope of product features is critical to understand clearly for the patent search, while fully defining the cost and necessary means of production will be applied to the investment evaluation. Scope management is primarily being measured based on the amount of "unknown-unknown" required activities that occur throughout the project duration. More specifically, project scope is measured by the efficiency of which the PM can deliver features and functions that meet user requirements within the limitations of the PM's production capacity. A change control system has been developed to ensure all approved changes are consistent with project priorities, add value to the invention and streamline production.

Collect Requirements: I to I is currently personalizing user groups and seeking to understand their needs, desired product configurations and buying preferences. The project objective is to produce an ultra-lightweight, high-strength shelter for individuals recreating in remote locations that are exposed to weather elements for extended periods of time. Scope and Quality management tools are combined to collect user requirements during prototyping and observation activities; shelters are strategically placed in populated outdoor locations to inspect design and materials performance while recording information on public interest.

Project Risk Management

Project Risk Management was chosen due to the amount of uncertainty surrounding a project undertaken to deliver a new product. Also, the project is based upon exploiting a perceived opportunity. The project outcome will be enhanced by diligent and consistent risk and opportunity identification and analysis.

Risk management techniques is used exhaustively during planning to identify all known risks inherent to the work, while also identifying peculiar risks related to the concept design and production requirements. Opportunities have arisen throughout each phase of the project and tools are be used to anticipate and begin exploiting opportunities as early as possible. Risk Management performance is measured mainly by how significantly the work activities are affected by risk events, and the amount of

rework and activities required that were not previously planned for. Another measurement will track the amount of unforeseen expenses that arise during the work.

Qualitative Risk Analysis (QRA) utilizes techniques that prioritize and categorize project risk. A Probability and Impact Assessment (PIA) subjectively estimates probability of identified risks occurring and associated impacts if the risks do occur. The PIA visually illustrates significance of project risks, as well as opportunities, providing a basis for determining which risks warrant quantitative analysis. This information is summarized in the Probability and Impact Risk Rating (PIRR), which includes the amount of time a risk can be occurring before it becomes known to the Project Team.

The potential impact of risks on project objectives and activities is numerically quantified using three-point estimates for duration and cost. Expected activity durations are derived from these risk-applied estimates. Risk affected activities on the critical path are given priority; although, risks affecting non-critical activities are also quantified to determine if risk has potential to cause activities to become critical. A main objective of applying PM Risk Management is to determine the expected cost and duration of project activities by factoring risk probability with expected impacts of risk events.

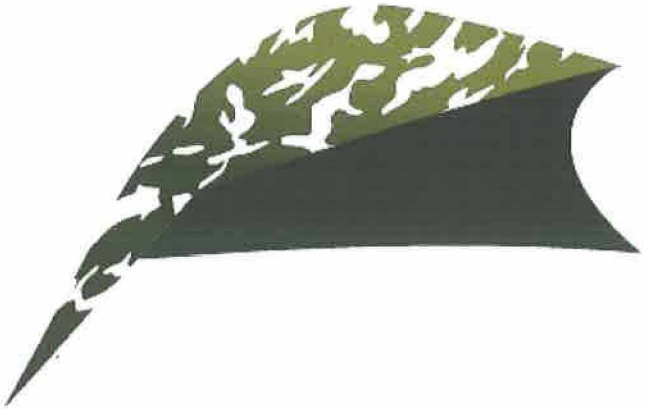
Project Quality Management

Project quality management was chosen as a main project objective to deliver a shelter with marketable attributes. For the shelter to be marketable it must conform to user requirements. During project planning, quality management enhanced the project by identifying a need to provide multiple shelter designs. The project will deliver purpose built shelters for those individuals who are comfortable sitting on the ground; enthusiasts who are overly concerned with needing the lightest possible weight gear; and, recreationalists who desire a shelter with enough room for two or more people.

The goal of this project was to invent a product that conforms to user's requirements while developing performance measurements for gaging public interest. To meet requirements quality metrics will be applied during prototyping and marketing to determine how well the product fills a market need, and also its overall functionality and utility. While performing quality control (QC) methods will be developed to ensure each prototype is built with dimensional consistency. Quality assurance (QA) will test QC methods to determine if they are in fact detecting variation and improving quality.

Overall, project quality is being measured on durability of the design, usefulness of the patent, and user feedback. Quality of patent search is measured by the amount of relevant patent claims found, their similarities to the shelter concept, and a perceived complete capture of all pertinent patent classifications.

Quality Enhanced Project Value: Ultimately, the Project Manager plans and manages the work to create value for ATC Company and shelter end-users. Idea to Invention uses Value Metrics in addition to quality standards to measure value, or utility, provided by shelter product and overall project. Value Metrics measure project performance in terms of how much value, tangible or intangible will be created by executing the project. The project measures product value by the extent that shelters meet stated product requirements in terms of performance, functionality and ease of use. Product value is measured in the field during testing activities and can be defined by how much perceived value the shelter provides for the user.



PROJECT MANAGEMENT PLAN
IDEA TO INVENTION

DAN AICHER | PM686B

12.8.14

ABSTRACT

It is estimated that less than 1-3% of patented inventions produce profits for the inventor. The cost of filing and examination fees for a non-provisional patent can range from $2,000 to $10,000 and beyond. ATC Company understands this uncertainty and will undertake a project to effectively measure the marketability of a new shelter product and determine its originality, prior to investing a patent. The Idea to Invention (I to I) project objective is to apply Project Management principles and deliver a process for materializing an idea, measuring its utility and commercial viability as a product, conducting an exhaustive patent search and producing a thorough Provisional Patent Application (PPA). Specifically, the project will deliver both a product line of personal shelters and a process for establishing first to invent rights to patenting the shelter's function and method of operation.

ATC shelters enable outdoor enthusiasts to maintain a weatherproof forward operating position in a remote location, upon varying terrain gradients and conditions typical of tundra, boreal and alpine environments. Unlike most recreational tent and shelter products available, ATC shelters do not require a suitable site for setup; rather, they provide an ultra-lightweight, adaptable solution to establishing cover in nearly any terrain.

TABLE OF CONTENTS

INTRODUCTION

Each year millions of Americans spend time recreating outdoors. Enjoying the outdoors inherently requires a range of products for personal comfort and protection from weather elements. On overnight or extended trips weather becomes an increasingly significant factor; and in Alaska, among many other locations across the Northwest, the effects of weather can make or break a trip.

ATC Company has identified a perceived niche in the outdoor recreational equipment market for ultra-lightweight, freestanding, reinforced personal shelters. Established consumer markets exist for outdoor tents, sun shades and shelters, although there appears to be no market presence of terrain adaptable shelters specifically designed for photographers, videographers, hiking and hunting enthusiasts, or other outdoor recreationalists.

The Idea to Invention (I to I) project objective is to apply Project Management principles and deliver a process for materializing an idea, measuring the idea's utility and overall viability as a product, executing a thorough patent search and filing a Provisional Patent Application (PPA).

PROJECT MANAGEMENT APPROACH

Idea to Invention will employ a systems-based, creative approach to planning and managing interrelated work activities undertaken to deliver a shelter with marketable attributes. The systems used are built upon a Project Management framework of tools, techniques and practices that assist the Project Manager in prototyping and testing a product idea, developing and managing changes required to maintain originality, and delivering a product solution that conforms to user requirements. This managed approach to delivering a new product will employ creativity throughout the duration adapting the work to peculiar requirements determined by design, production and market variables. As the project is elaborated more information regarding patents, market segments and requirements becomes known. I to I will proactively integrate this information into the work via change management as necessary to meet project objectives.

The Project Manager, Dan Aicher, has overall authority and responsibility for managing and executing this project in accordance with the Project Management Plan (PMP), Project Documents and Subsidiary Management Plans. The project team consists of a Primary Inventor (PI), Project Manager (PM), and Project Sponsor. The PM performs project planning and drafts the PMP, project documents and subsidiary management plans which are reviewed and approved by the project sponsor. All funding decisions will be approved by the PM. Approval authority for all change requests, corrective actions and risk response activities has been delegated to the PM, in writing, and signed by the project sponsor.

PROJECT SCOPE

Idea to Invention will deliver a product line of outdoor personal shelters comprised of three separate but similar designs. The shelter design and function will serve as a basis for conducting patent classification, sub classification and individual patent search activities. Work also includes prototyping and conditions testing, project and product performance measurements, extensive market analysis and multiple invention assessment activities.

The project will deliver both a product and a process for establishing first to invent rights to patenting the shelter's function and method of operation. Patent search and invention assessment activities are initially planned and thoroughly developed as the project progresses and learns and improves through integrated change control. As knowledge is gained throughout the project continuous improvements are made, performance metrics are refined, and lessons learned are documented to optimize the Idea to Invention process.

Major Deliverables

The updated PMP and Project Report include the following deliverables:

- Six (6) prototype All Terrain Covers
- Market analysis, segmentation of user groups and quantified target markets
- Patent search strategy, results and improvements
- Twelve (12) production run shelters consisting of three similar designs
- Informational product website with commercial capability
- Scope and Change Management Plan
- Value Focused Quality Management Plan
- Active Risk and Opportunity Management Plan
- Invention Assessment and Recommendations
- Project Management Plan (PMP), reports and other PPM requirements
- Provisional Patent Application filing
- Electronic and hard-copy lists of lessons learned

STAKEHOLDER ANALYSIS

Stakeholders are identified and assessed to determine their interest in the Idea to Invention project. Key Stakeholder requirements provide a baseline for the project scope of work. The following Key Stakeholders are determined to have the highest influence on the project outcome:

- Primary Inventor / Project Manager
- United States Patent and Trademark Office (USPTO)
- Market Competitors
- Target Market End Users

- Project Sponsor
- Patent Agent/Consultant
- ATC Company

The Stakeholder Register contains identified Stakeholder interest as it affects the project objectives and their requirements related to the scope of work. The Idea to Invention Stakeholder Register is provided in Appendix A, Stakeholder Register.

PERFORMANCE PLAN

The project defines "high performance" as a continuous increase in project value by effective management and completion of work activities. Activity performance is measured by comparing estimated versus actual work performance, as well as subjectively assessing the incremental value created by accomplishing the work. High performance work activities are completed on time and significantly improve in method. Project performance will be measured by how well work activities accomplish the requirements necessary to achieve project objectives. High project performance is measured by the extent to which the project improves in process, captures and integrates lessons learned, and manages work to deliver a marketable invention concept.

Idea to Invention uses Key Performance Indicators (KPI) as a secondary method of measuring overall project performance. KPI's for the project are documented in the Scope Statement. KPI's related to schedule performance are carefully monitored and controlled as project priorities constrain time at the acceptance of cost.

Marketing Approach

Idea to Invention will personalize user groups and seek to understand their needs, desired product configurations as well as purchasing preferences. The project will advertise locally and on the internet to retail and consumer markets. Local and web-based marketing efforts intend to reach consumers, demonstrate usage and functionality of shelters and provide a vehicle for gaining public interest. Specific marketing tactics are included in the Test Market Response activity, and are proprietary to ATC Company.

SCHEDULE MANAGEMENT PLAN

The Idea to Invention project schedule has been created using MS Project 2010 with work activities identified and listed in hierarchical order using WBS Chartpro. The project utilizes three-point estimates to calculate expected durations of work activities. Logical activity sequencing determines the order of project activities to optimize efficiency and minimize delays in the schedule.

Three-point estimating integrates uncertainty into the project schedule by using an estimate range as opposed to a single data point. The estimate range is used to calculate

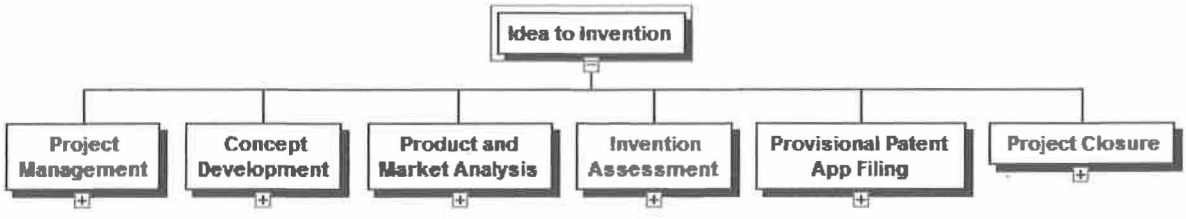
predicted durations, variation, and a standard deviation (SD) for work activities and the overall project. This allows the PM to communicate honest and realistic schedule estimates, with preferred confidence levels, to Key Stakeholders.

Roles and responsibilities for schedule development are as follows: The Project Manager will be responsible for work package definition, sequencing, and estimating activity durations. The project team must agree to the proposed work package assignments, durations and activity sequencing. Once a preliminary schedule has been developed it will be reviewed by the PI, PM and Project Sponsor. The project manager will subsequently obtain schedule approval from the project sponsor and baseline the schedule. The Project Schedule is provided in Appendix B, Project Schedule.

Work Breakdown Structure

The project's Work Breakdown Structure (WBS) is comprised of work packages that have durations ranging from 4 hours to 90 days. WBS Dictionaries define and detail all work packages for the Idea to Invention Project. Activities detailed in WBS Dictionaries outline specific work packages which must be performed to complete each deliverable. Work package definition includes all tasks, resources, deliverables and relevant risk. Every work package in the WBS shall be defined in the WBS Dictionary and will aid in resource planning, task completion and ensuring deliverables are traced to project requirements.

High-level WBS illustrated below:



The project's work breakdown structure is provided in Appendix C, WBS.

PROJECT SCOPE MANAGEMENT PLAN

The project scope is defined by the Scope Statement, Work Breakdown Structure (WBS) and WBS Dictionaries. Project requirements are defined and linked to product and project scope as shown in the Requirements Traceability Matrix. The Project Manager, Primary Inventor, and Project Sponsor will establish and approve documentation for measuring project scope to include validated and accepted deliverables. A Project Scope Statement is provided in Appendix D, Scope Statement.

Applied Scope Management

Project scope management is ideally suited for defining and sequencing the work, managing change, and controlling activities required to develop a marketable invention concept. Product scope management guides the PI in ascertaining which features are feasibly constructible while defining functional parameters of shelter operation. Project scope control manages changes to shelter design as information is gathered throughout the project; specifically during quality management activities and design modifications due to existing patent claims. What the shelter does, and particularly what it does not do, differentiate it among existing patent claims and other marketed products. I to I seeks to increase this margin of differentiation to increase product utility and also enable a broader range of patent claims to be made on technical attributes that make up the invention concept.

Collect Requirements: I to I's primary objective is to create an original and marketable, and currently unavailable, recreational outdoor product. The goal of collecting requirements is to identify stakeholder needs, wants and requirements that are not already met on the market with similar shelters. As a critical component of the project is protecting intellectual property (IP), options for collecting requirements are limited as risk tolerance for making information public about the invention concept is low. Therefore, focused end-user data gathering combined with shelter-related product research is employed by the PM to create a market niche and begin collecting requirements. As a market niche becomes more defined the exacting needs of user groups are observed, recorded and linked to product scope features.

Project requirements are accomplished thru work packages created by the PM. Work is meticulously planned to efficiently and quickly complete tasks that are necessarily undertaken to accomplish project objectives. Collected and known requirements provide an outline for detailing the scope of work during project planning. PM defines initial project requirements and the PI defines initial product and end-user requirements.

Product requirements provide a performance specification basis for shelter design. Project requirements are established in project planning and elaborated through patent search work, production and delivery needs, and market research. The project team understands that certain requirements may not become known until after project planning.

Requirements Documentation including a Requirements Traceability Matrix show how requirements meet project objectives while tracking them throughout the project lifecycle. Requirements Documentation is provided in Appendix E, Requirements Documentation.

Project Requirements

- Change control system; control scope to maintain uniqueness, enhance product utility.
- Risk Management Plan and Metrics, Process developed for managing uncertainty, Opportunity enhancement plan.
- Risk/Opportunity analysis; weekly review of upcoming uncertainty, risk response planning.
- Performance tracking metrics including CPI, SPI, TCPI, and also subjective feedback from target market, retail and consumer.
- Documented Quality Assurance and Continuous Improvement processes.
- Ability to adapt Risk, Scope management and Quality processes and metrics to other consumer product invention ideas.
- Provisional Patent Application must be complete, reviewed by Patent Agent if necessary
- Patent search must be sufficiently exhaustive to provide 80% confidence that no similar prior art exists.
- New business license filing, legal requirements met, and accounting system in place.
- PPM deliverable requirements
- Marketing cost assessment; marketing methods analysis

Product Requirements

- Shelter design is original and not found on retail market.
- Shelter is feasible to build, within personal skills and current available resources to deliver.
- Concept does not infringe on existing patents or pending patent application claims.
- Shelter design shall be freestanding, collapsible, and provide weatherproof coverage.
- Shelter design must be able to withstand 40 mph winds and capable of shedding sustained rain and snow.
- Shelter design shall be adjustable to accommodate varying terrain gradients, brush, tundra, and forested environments.
- Target market must be identified, quantified and exposed to product.
- Limited competition, similar but different products available on market.
- Shelters must be sold with all required components; stuff sack, stakes, etc.
- Product liability: Risk Management transfer strategy.

Defining and Managing Scope

The project scope of work is defined by both project and product requirements. Initial requirements incorporated into shelter design are defined by the PI. Through project planning the PI's requirements set the basis of product design; during project execution

user and patent related requirements may warrant changes in shelter design. Idea to Invention applies scope management in defining the work and actively managing changes to the scope baseline as necessary to meet project objectives.

The WBS contains all project activities and is used to decompose the work into work packages that are more clearly understood; and most importantly, more accurately estimated and planned. The PM utilizes the WBS to ensure all of the work required is accounted for and no additional unnecessary tasks are included in the work. Work activities are sequenced in logical order with relationships between activities established to minimize delays in project progression.

Project scope management interacts with both risk and quality management activities throughout the duration. The project will plan risk response activities and incorporate them into the project scope of work. It is expected that quality management activities will uncover necessary changes to the product scope. Idea to Invention is designed to actively manage changes within the project to incorporate newfound information that facilitates progression towards achieving project objectives.

Change Management Plan

The project will perform integrated change control to review, approve and manage changes to the product concept, scope baseline and PMP. This Change Management process screens to determine if change is consistent with priorities and whether it is feasible and necessary to achieve project objectives. Impacts on schedule and scope, cost, risk and quality are reviewed in detail and evaluated to facilitate informed decision making. A Change Control Board (CCB) consisting of the PI and PM will review and approve or reject in part, or in full, all change requests.

Product scope change requests are managed to maintain functional originality while keeping complexity of design and production requirements within range of the PM's capabilities. Additional product design features and functions are limited to the PM's personal skills, available tools and materials, and capacity to physically deliver the product. Technical functionality of product design is constrained by existing patent claims and submitted patent applications, or prior art. A project objective is to avoid infringing upon prior art; therefore, similarities of existing patent claims may necessitate design changes to maintain product originality.

Change requests related to project scope may be initiated by the PM, PI or Project Sponsor. The PM has final approval authority over changes in project scope. Idea to Invention includes planned changes in the work in the form of risk and opportunity response activities. The Project assumes change will be required at completion of patent search activities as it relates to product design and functionality. The WBS and schedule include schedule and cost contingencies for prototyping, shelter construction and invention assessment activities.

Approved changes to the project scope of work shall be consistent with the following project prioritization and evaluation criteria:

Project Prioritization

	Time	Scope	Cost
Enhance		X	
Constrain	X		
Accept			X

Change Management Criteria

1. Changes in product design shall only be related to features as opposed to function,
2. Product scope changes do not increase or modify scope of patent search work,
3. Risk associated with change is quantifiable,
4. Change directly and positively affects a stated project objective,
5. Implementation of all changes shall not increase length of critical path more than 10 days, or create multiple critical paths in schedule.

Verify Scope

The PM will formally accept project deliverables as the work packages that support the activities are completed. Activity completion is also based upon meeting the requirements that necessitated the work activity. As the project progresses and work packages are completed, the PM will present completed activities to the Sponsor for formal acceptance. PM will certify and accept work packages when completed; the Sponsor will accept main project activities and the overall project when complete.

Project Scope Metrics

Project scope management is continuously measured to improve and increase the effectiveness of project planning, defining and scheduling the work, and controlling changes to the scope baseline. The following scope metrics are applied throughout the project duration:

- How many unknown requirements become known after project planning?
- How many project activities were unnecessary?
- Did the project accurately estimate the amount of changes that would occur throughout the duration?
- As a percentage, how many scope features and functions can be incorporated into shelter design that are derived from Collect Requirements?
- How much utility does the invention concept provide that is not already claimed as prior art?

Quality Management Plan

Idea to Invention methodically plans quality to create standards that ensure shelters meet user and project requirements. The Project Quality Management Plan (QMP) focuses primarily on two critical aspects of the work: delivering a shelter that conforms to product requirements and executing a thorough patent search to determine patentability of invention concept. The Primary Inventor creates the QMP by drawing on significant experience engaging in activities that necessitate use of the shelter; in effect, the PI is the product end-user, and shall define core product quality requirements and create a solution. Additional quality requirements obtained thru field testing and public interest observations are incorporated into the QMP and subsequently used to develop a shelter solution that better conforms to user requirements.

Value Focused Approach

Ultimately, the Project Manager plans and manages the work to create value for ATC Company and shelter end-users. Idea to Invention uses Value Metrics in addition to quality standards to measure value, or utility, provided by shelter product and overall project. Value Metrics measure project performance in terms of how much value, tangible or intangible will be created by executing the project. The project measures product value by the extent that shelters meet stated product requirements in terms of performance, functionality and ease of use. Product value is measured in the field during testing activities and can be defined by how much perceived value the shelter provides for the user.

Project value is progressively acquired thru completing work activities which aggregate to create overall value for the Primary Inventor/Project Manager, and ATC Company. Project value is measured and validated on a weekly basis. The PM presents recently completed deliverables and the progress of work to the Project Sponsor, who accepts and validates project value as progression towards achieving the project objectives. Upon project completion value is represented by established means and methods of production, a tested and improved shelter design, and an invention assessment to determine if further production is commercially viable.

Applied Quality Planning

The project will deliver variations of shelter design to more suitably meet the requirements of multiple target markets. Project quality requirements include statistical analysis of user groups to segment target markets and estimate the amount of time they would benefit from utility provided by shelters. The project will run multiple scenarios simulating situations wherein end-user requirements vary in demand, configuration, and delivery preference and purchasing method to better understand how the project can deliver a shelter that meets the needs of a target market. This research supports the project objective of conforming to user requirements by better understanding the user group's needs.

Product quality is measured with control charts that track physical dimensions of shelter outputs. Quality of patent search is measured by the amount of relevant patent claims found, their similarities to the shelter concept and a perceived complete capture of all pertinent patent classifications.

Prototype shelters consisting of three separate but similar designs will be built and finished to end-product quality. The prototypes will be tested and inspected in the field: one placed outdoors continuously for 90 days, and two placed in the field weekly for the 60 day "Test Market Response" activity in the most populated local recreation areas. This process will test the shelters in wind and weather providing performance information for review; and also, expose shelters to the public to begin gaging user interest in the product. Inspection reports documenting field trial observations are recorded in the QMP and reviewed by the PI and PM weekly throughout the project duration. Information derived from inspection and/or public interest may warrant corrective action, or design changes, to increase the shelter's conformance to user requirements.

Public interest observed will be categorized as: "Attention" meaning an individual or group maintained eye-contact with a shelter for more than 3 seconds; "Approach" when an individual approaches and asks at least one question related to the shelter; and, "Discussion" when an individual approaches and asks two or more questions related to the shelter. Public observations are recorded by the PM in the QMP and used to measure how well the shelter conforms to a perceived need demonstrated by public interest. The PM will plan, monitor and control all quality management activities to ensure the project is meeting quality standards.

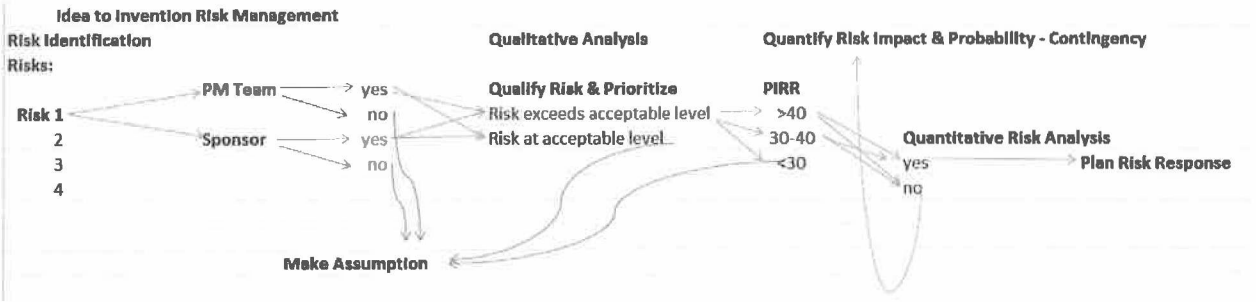
Performing Quality Control and Quality Assurance

Shelter outputs are inspected by taking five dimensional measurements to check symmetry and strength; two subjective observations of appearance; and, three tests of stability when directional forces are applied. QC measurements are entered into control charts for analysis which seek to identify special causes of variation, and determine whether shelter production process is performing within acceptable limits. QC metrics are administered by PI with resulting measurements being analyzed by PM for trends or defects. If or when defects are found, corrective action may be recommended. Corrective actions related to quality requirements are contingent upon bilateral, PI and PM approval, rather than CCB approval.

Idea to Invention continuously performs Quality Assurance (QA) to assess performance in terms of how effective project quality standards are in actually measuring quality, and also adding value to project objectives. QA runs concurrently with Quality Control (QC) activities to analyze QC measurements and repeatedly audit project quality requirements. The main objective of performing QA is to test and refine project quality requirements to continuously improve product viability, and the PMP.

Risk Management Plan

The Idea to Invention risk management approach is focused primarily on the timing, frequency and combination of risk events. Uncertainty is always present when attempting to bring a new product to market; although, I to I strategically plans risk response activities for the most pertinent and current risks which are determined to have the greatest impact on project objectives. Additionally, opportunity is initially and continuously assessed throughout the project to exploit information arising from progressive elaboration. The project will identify and characterize project risk, qualify and quantify risk impacts on project objectives, and plan risk response strategies in accordance with stated project priorities. The Idea to Invention Risk Management process is graphically depicted below:



Active Risk Management

Idea to Invention will initially and actively manage risk and opportunity throughout the project duration. The project emphasizes limiting variation in planned versus actual work performance due to the effects of risk events. The PM will define risk exposure levels throughout the project, the probability of risk events occurring and the risks or opportunities that have the most potential impact on the project.

The Idea to Invention project is predicated upon exploiting a perceived opportunity. As such, the project proactively seeks to identify opportunities as the work progresses and more information becomes known. Prior to starting each work activity the PM reviews the Risk Register to determine if relevant opportunities are forthcoming, and if so, decides whether to enhance opportunity with a response. Additional work or a proactive change to the scope of activity work may be executed if the PM feels the action would increase progress towards achieving one or more project objectives. Opportunity enhancements are initially identified in planning, actively sought throughout the project and implemented via risk response activities.

As identified risk events occur the PM will reference inactive task WBS dictionaries and determine if response action is warranted. Implementation of a risk response action is not subject to CCB approval; rather, the PM provides approval to seamlessly integrate response work into the project schedule. Activating a risk response activity is

considered an approved change and the work is automatically added to the scope baseline.

Risk Identification
Idea to Invention employs brainstorming, conditions testing, and invention assessment research to identify project risks and opportunities. Risks are characterized to understand exactly how project objectives could be affected. The PI and PM are responsible for identifying and documenting risks from past experience, functional knowledge of product and product industry, and unique uncertainties related to new product development. Identified risks and opportunities are maintained in the Risk Register along with initial risk response activities.

Risk identification is categorized under primary, secondary, and tertiary risk levels. Primary risks involve uncertainty that may directly impact project objectives or the performance of work activities undertaken to achieve project objectives. Primary risks can arise from internal or external sources and are evaluated to determine if a strategic response is necessary. Secondary risks occur when a risk response activity does not work as intended and/or creates a new risk to the project objectives; secondary risks will always warrant a risk response. Tertiary risks include residual and all other risks that are qualified, quantified, and deemed tolerable enough to not warrant a risk response. Identified risks are documented, maintained and reviewed by the PI and PM during weekly project meetings.

Qualitative Risk Analysis
Qualitative Risk Analysis utilizes techniques that prioritize and categorize project risk. A Probability and Impact Assessment (PIA) subjectively estimates probability of identified risks occurring and associated impacts if the risks were to occur. This information is summarized in the Probability and Impact Risk Rating (PIRR), which includes detection time to assess the amount of time a risk can be occurring before it becomes known to the Project Team. The PIA visually illustrates significance of project risks, as well as opportunities, providing a basis for determining which risks warrant quantitative analysis. Lower priority risks are maintained on a Watchlist and reviewed weekly by the PM. The PIA and PIRR are provided in Appendix F, Risk Register.

The timing and frequency of risk events is factored into QRA to accurately estimate the extent of potential impacts on project activities. Risks that have potential to occur quickly, during critical activities, or multiple times throughout the project are considered significantly hazardous to project objectives. Identifiable combinations of risk events that are more likely to magnify negative effects on the project are also considered significantly hazardous.

Qualitative Risk Analysis outputs include the PIA, PIRR and Watchlist documents to update and support the Risk Register. In addition, Qualitative risk analysis generates a list of significant risks that warrant further quantitative risk analysis.

Quantitative Risk Analysis

The project's quantitative risk analysis seeks to clearly understand the cost and schedule implications of risk events occurring. Risk exposure for each activity is quantified to show which activities could be impacted the most, and how impacts of risk affect the overall schedule. Risk affected activities on the critical path are given priority; although, risks affecting non-critical activities are also quantified to determine if risk has potential to cause activities to become critical. The objective of this analysis is to determine risk exposure at each stage of the project.

The project prioritizes impacts of risk by conducting sensitivity analysis to determine which risk events have the highest potential to positively or negatively affect project objectives. A tornado chart graphically illustrates risk significance, while PERT analysis numerically quantifies the probability of identified risks occurring. PERT analysis is predicated upon three-point estimates that provide a range depicting inherent uncertainty in the outcome of work. Estimated ranges of activity duration and cost are used to calculate variance and standard deviation (SD) for work activities and the project. Idea to Invention utilizes SD's to create probability distributions for activity and overall durations. The probable effects of risk and combinations of risk events on schedule and cost are simulated using a Monte Carlo analysis.

Quantified effects of risk for each activity are used to create cost and schedule contingencies. Contingency is added to the cost and schedule baseline and used to manage tertiary and unidentified risk. Idea to Invention allocates project contingency as an indirect risk response measure to offset the effects of unidentified or unplanned risk events occurring. Upon the completion of the project during the closeout process, the PM will analyze each step of the risk management process. Based on this analysis, the Project Manager will identify any improvements that can be made to the risk management process for future projects. These improvements will be captured as part of the lessons learned knowledge base.

Risk Response Planning

Risk response planning uses multiple strategies to mitigate, transfer, avoid or accept project risk. Every risk response activity is evaluated using a cost-benefit analysis to ensure the cost of responding to risk does not exceed a risk's financial and/or schedule impact on the project. Primary risks that are prioritized as needing quantitative analysis will have risk responses plans that are scheduled as inactive tasks, ready to be implemented by the PM when warranted. The project also plans for all known secondary risks created by a response activity, as well as alternate response activities in the event the initial risk response does not work as intended. Residual risk will be

tolerated up to a point where the PM believes the risk response was at least 70% effective at managing a risk's impact. Initial risk response planned activities are documented in the Risk Register.

Risk Register

The Risk Register for this project is provided in Appendix F, Risk Register.

Risk Management Metrics

Risk management is continuously measured to provide information on how to improve the performance of identifying and managing risk. The project will utilize the following risk metrics:

- How many unknown-unknown risks occurred during the project?
- How many unplanned tasks become project requirements?
- How effective are corrective actions and/or risk response activities in keeping the project on schedule and within budget?
- How many identified risks occurred?
- Did qualitative risk analysis succeed in accurately prioritizing project uncertainty?

COMMUNICATIONS MANAGEMENT PLAN

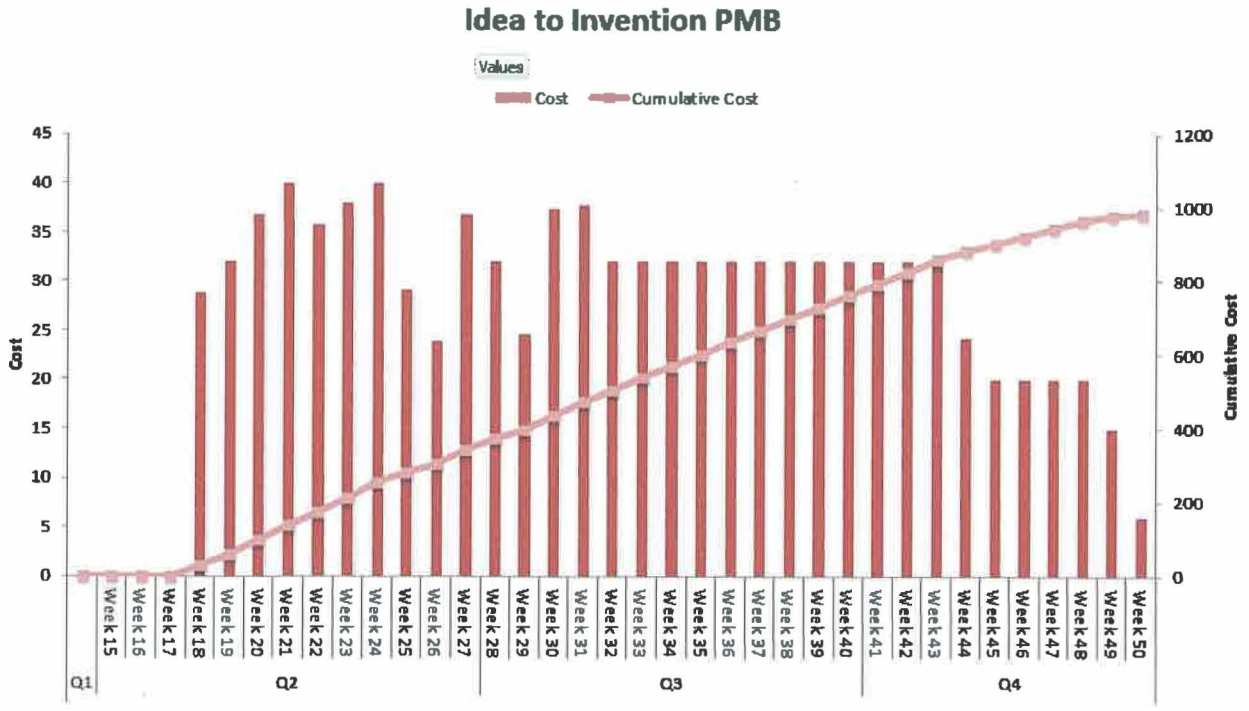
This Communications Management Plan (CMP) will provide a framework for communications within the Idea to Invention project. The CMP guides communications throughout the project life cycle and is updated as communication requirements change. This plan identifies and defines roles of I to I project team members as they pertain to communications. Since the project team consists of only two members communications are simply created by the PM/PI and sent to the Project Sponsor on a weekly basis, or as approved changes are implemented. Monthly project status meetings will review work performance, upcoming activities, risk or opportunity on the horizon, and any collected requirements or quality related issues. The Project Sponsor will provide feedback on project communication as necessary, or when solicited input is requested by the PM.

COST MANAGEMENT PLAN

The PM is responsible for managing, and will present cost performance during monthly status meetings. Project Manager will measure cost performance and if needed implement corrective action to get the project back to within budget. All Cost Management authority, to include approved changes and rebaselining the project budget is delegated the PM.

PM will measure project performance with Earned Value Management (EVM) metrics. As the project prioritizes accepting cost to constrain time Schedule performance metrics

are carefully monitored and controlled. The PM will report Cost and Schedule Performance Index (CPI and SPI), Schedule Variance (SV) and Cost Variance (CV), Estimate to Complete (ETC) and To Complete Cost Performance Index (TCPI) on a monthly basis to the Project Sponsor. EVM metrics are compared to the performance measurement baseline (PMB) shown below:



Variances of 10% or +/- 0.1 in the schedule performance index will trigger a corrective action warning and may necessitate corrective action. Cost variances of 20%, or +/- 0.2 in the cost performance indexes will be reported and likely require corrective action from the Project Manager in order to bring the cost and/or schedule performance indexes back to within allowable variance. Planned corrective actions do not require CCB approval; unplanned corrective actions require a project change request and must be approved by the CCB before activity implementation.

Procurement Management Plan

The Project Manager will manage all procurement related activities under this project, and is authorized to approve all procurements up to $5,000. Any procurement actions exceeding this amount must be approved by the Project Sponsor. The extent of I to I procurement management will focus on procuring raw materials for constructing shelters. The PM will arrange agreements with vendors to supply tent pole sections, outdoor fabric, and all associated components necessary to deliver a finished shelter product. PM will approve all procurement requests, invoices, and payments to vendors.

The Project Manager will also measure performance as it relates to vendors providing necessary goods and/or services at reasonable rates and within agreed upon lead times, and communicate this to the PI and project sponsor.

Staffing Management Plan

This project will operate in a projectized organizational structure. All project work will be done by the Project Manager and the Primary Inventor. Staffing requirements for the I to I project are unique in that the PM and PI positions are undertaken by a single individual.

Project Manager / Primary Inventor (1 position) – responsible for all management activities in the I to I Project. The Project Manager is responsible for planning, creating, and/or managing all work activities, tracking project measurements, progress reporting, and communications.

Project Closure Plan

Project Closure activities include verifying acceptance of all project deliverables, as well as documenting all lessons learned, process improvements, and efficiencies that will be considered organizational process assets. A quality audit will be conducted during project closeout to assess the effectiveness of the QMP and make improvements that were identified during the project. Lessons learned and quality improvements provide standards and refined processes for ATC Company to use managing future projects. Once these activities are complete, electronic and hard-copy lists of lessons learned are provided to PM Team members and the project is considered administratively closed out. Project closeout and final acceptance will occur when all work activities are completed and project requirements are met. PM will closeout all procurements with materials suppliers and other vendors.

The project may be terminated early at go/no checkpoints due to product infeasibility, lack of patentability, or other unknown external factors. Early termination does not itself constitute project failure, as the project is designed to screen out inventions that do not show measureable signs of commercial viability, or that are already patented. After administrative and project closeout, or early termination, the PMP and all project documents, shelter prototypes and materials become property of ATC Company. The project team is released back to their functional jobs upon completion of project closeout.

Sponsor Acceptance

Approved by the Project Sponsor:

_____ Date: _____

Project Sponsor

Recommended by the Project Manager

_____ Date: _____

Project Manager

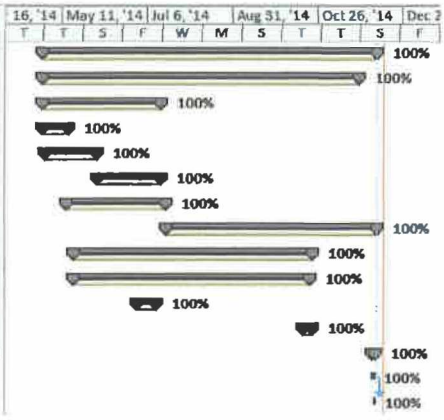
Appendix A: Stakeholder Register

Stakeholder	Assessment Information	Stakeholder Classification
Primary Inventor (Project Manager)	Requirements: Progress concept safely and effectively thru PPA process. Provide PM expertise to effectively deliver project per stakeholder requirements. Maintains authority of funds used in executing project, to include final decision at Go/No Go milestones. Expectations: Draft PMP, provide technical skills to develop idea, conduct patent search, file Provisional Patented Application (PPA).	Key; Internal, Supporter
Secondary Inventors	Requirements: Provide subject matter expertise and support patent process progression. Influence: Full participating interest in all phases of patent process; positive influence critical for project success.	Key; Internal, Supporter
United States Patent and Trademark Office (USPTO)	Requirements: PPA must be complete, although will not be examined on its merits. Influence: Authority in granting PPA; effective go/no-go stakeholder	Key; External, Neutral
Market Competitors	Requirements: Maintain existing market share. Influence: Can legally use invention idea if invention not properly protected. Phase: Active in all phases of patent process, from concept thru invention and subsequent marketing period.	External, Resistor
Target Market End Users	Requirements: Shelters meet user's needs, achieves high-quality at a cost effective price. Influence: Provisional patent application period; need buy-in and sales commitments for project success.	Key; External, Neutral
Marketing Consultants	Requirements: Marketable and viable product. Influence: Make or break initial	External, Supporter

	sales period during provisional patent period.	
Manufacturing Consultants	Requirements: Marketable product, large enough order quantity to make relationship viable. Influence: Great influence over ability for PM to increase production quickly to meet demand.	External, Supporter
Patent Consultants	Requirements: Invention concept meets requirements for patent; needs all details and specification of invention, and needs to understand what and how invention differs from previous inventions.	External, Neutral
Materials Suppliers	Requirements: Payment for providing raw materials and a reasonable amount of notice to fill order. Phase: Prior to product market testing.	External, Supporter
Project Sponsor	Requirements: Maintains support for project throughout duration; technical aspects of design remain confidential thru project closure. Phase: Support required during all phases. Influence: Can terminate project at any point.	Key; Internal, Supporter
ATC Company	Requirements: Maintain fully protected business entity; limit personal liability; maintain high product value, name recognition and reputation Phase: Throughout project lifecycle Influence: Must be established and operational to conduct shelter sales.	Key; Internal, Supporter

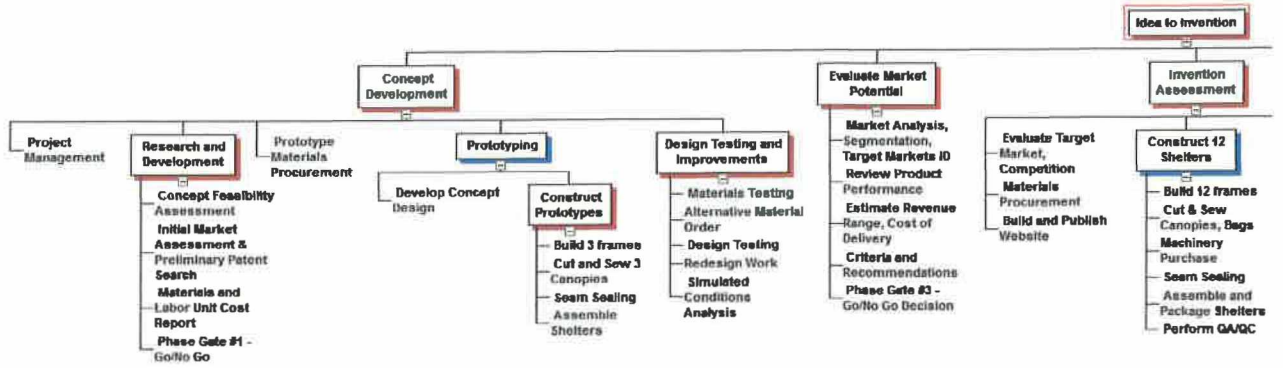
Appendix B: Project Schedule

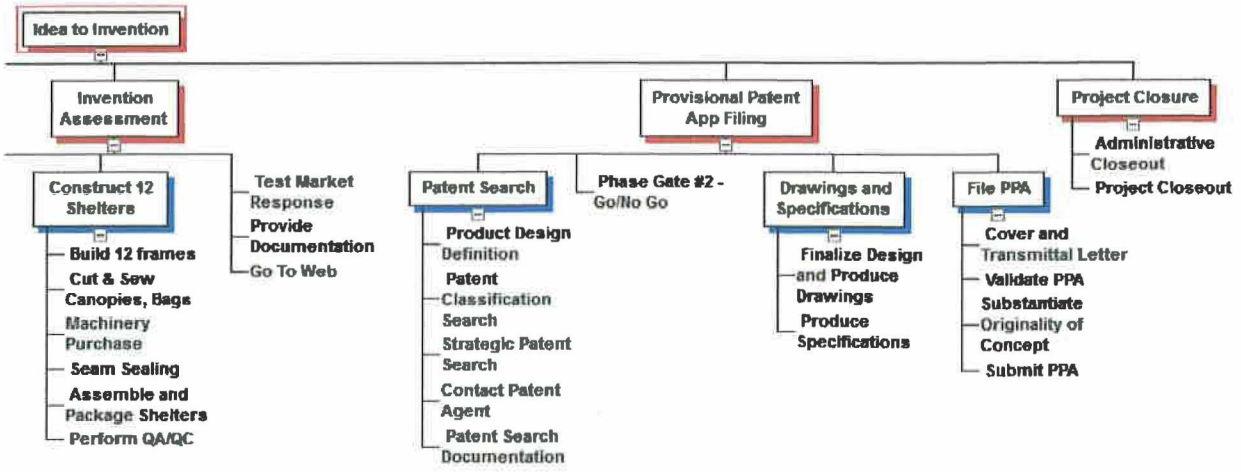
WBS	Task Name	Duration	Start	Finish
1	Idea to Invention	158 days	Mon 4/28/14	Wed 12/3/14
1.1	Project Management	150 days	Mon 4/28/14	Fri 11/21/14
1.2	Concept Development	56.63 days	Mon 4/28/14	Tue 7/15/14
1.2.1	Product and Market Research	14 days	Mon 4/28/14	Thu 5/15/14
1.2.2	Prototyping	24.63 days	Wed 4/30/14	Tue 6/3/14
1.2.3	Design Testing and Improvements	30 days	Tue 6/3/14	Tue 7/15/14
1.3	Product and Market Research	47.63 days	Wed 5/14/14	Fri 7/18/14
1.4	Invention Assessment	98.38 days	Fri 7/18/14	Wed 12/3/14
1.5	Provisional Patent App Filing	112.25 days	Mon 5/19/14	Wed 10/22/14
1.5.1	Patent Search	111 days	Mon 5/19/14	Mon 10/20/14
1.5.2	Drawings and Specifications	10 days	Mon 6/30/14	Fri 7/11/14
1.5.3	File PPA	4 days	Thu 10/16/14	Wed 10/22/14
1.6	Project Closure	2.5 days	Mon 12/1/14	Wed 12/3/14
1.6.1	Administrative Closeout	2 days	Mon 12/1/14	Tue 12/2/14
1.6.2	Project Closeout	4 hrs	Wed 12/3/14	Wed 12/3/14



The Idea to Invention Project Schedule working file is in included in digital format and enclosed in the Project Binder.

Appendix C: WBS





Appendix D: Scope Statement

Product Description

Idea to Invention will deliver a test line of outdoor equipment products while applying PM principles to develop high-performance, continuously improving patent search and invention assessment strategies. The project will develop a product concept, protect its originality, and assess the concept's market and sales potential. In doing so, the project will design and construct three ultra-lightweight reinforced weatherproof shelters that are freestanding, adjustable to accommodate various terrain gradients, and intended to be used for both concealment and weather protection in the field. Shelters will be made in the USA, constructed of high-strength lightweight materials and specifically designed for outdoor enthusiasts.

Patent search work will involve domestic patent classification, sub-classification, application and individual patent search activities. Concurrent work will include a production run of twelve shelters comprised of three separate but similar designs marketed locally, and via the internet, to measure commercial viability. As knowledge and experience is gained throughout the project, performance metrics will be refined, lessons learned documented, and continuous improvements made to optimize the Idea to Invention process.

Project Acceptance Criteria

Project will be accepted at three phase gates with go/no go decision points. Each phase must be satisfactorily complete before the next phase begins. Design shall be marketable with no prior art technically similar to the product; therefore, product design will be accepted only if it passes all patent search requirements. Performance specifications for acceptance include multiple configurations that provide either cover from the elements, concealment, or both to meet application need. Product weight is limited to less than two (2) pounds per occupant. Design must be collapsible; capable of withstanding 40mph winds from any direction, and effective at shedding precipitation to include sustained rain and snow.

Project will be accepted as complete when all PPA filing requirements are met, invention assessment activities completed, and all project closeout activities have finished. Conversely, project may be terminated if phase gate requirements are not achievable, infeasible, or otherwise not in the best interest of the Primary Inventor.

Major Deliverables

The project scope of work will include the following deliverables:

- Three (3) prototype shelters
- Conditions testing methods and process for improving design
- Phase Gate 1 documentation; go/no go decision recommendation
- Patent search strategy
- Twelve (12) production run shelters consisting of three similar but separate designs
- Informational product website capable of purchase transactions

- Performance metrics and product viability evaluation
- Risk management and opportunity enhancement planning process
- Project Management Plan (PMP), reports and other PPM requirements
- Shelter design drawings and specifications
- Provisional Patent Application filing
- List of lessons learned
- Continuous process improvement plan
- Recommendation to proceed with production and pursuit of a non-provisional patent.

Project Milestones

The Idea to Invention project will have five main scheduled milestones:

1. Deliver and Present Project Management Plan - 4/22/14
2. Tested and Improved Prototype - 6/17/14
3. Patent Search Documentation - 9/2/14
4. Complete Invention Marketability Assessment 9/26/14
5. Successfully file Provisional Patent Application (PPA) - 9/30/14

Project Exclusions

Although this project will deliver and attempt to sell a product the scope of work does not include a business plan. Processes described within the PMP are not intended to provide a guide or manual for business start-up, new product development (NPD), operations management or marketing. The project will not include a guideline, list of best practices, or recommendations for "how to" invent a product.

Technical design of shelter will not be included in the PMP. Shelter is not designed to block UV rays or be exposed to the sun for extended periods of time. Patent search is limited to US patents, no international or global patent filing or search activities included in project. Project also excludes the activities required for filing a non-provisional patent application.

Project Constraints

Execution of the Idea to Invention (I to I) project will be constrained by available time and funding, as typically inventors have day jobs, families and other commitments. Shelter or product design will be constrained by prior art and pending patent applications. Production of shelters will be limited to inventor skills, equipment, materials availability, and overall feasibility of design.

Project Assumptions

The project assumes funding and time requirements needed to construct shelters is available, along with all necessary raw materials. It is assumed that PM has the skills, equipment, and capability to build prototype and production run shelters, or they can organize vendors necessary to deliver a finished product. Project assumes an online and physical presence, and will focus on both business to business (B2B) and business to consumer (B2C) markets.

Critical Success Factors

The Idea to Invention product concept must be unique and possess marketable attributes. Characteristics and attributes of the concept must be attractive to users, and not easily found on the open retail market. The idea to be invented must be determined original through exhaustive patent search work. Target market must be exposed, aware, and also capable of purchasing a product if so desired.

Key Performance Indicators

1. Schedule Performance Index (SPI) – I to I project needs to be completed by the end of this year due to contract requirements. As such, the project's adherence to the schedule will be more heavily scrutinized than the project's cost performance.

2. To Complete Cost Performance Index (TCPI) – The TCPI will help the Project Manager determine the amount of effort required to complete the remaining work. A TCPI of 1.05 will be trigger for corrective actions, while a TCPI of .90 will trigger opportunity enhancements in the form of additional marketing.

Project Prioritization

	Time	Scope	Cost
Enhance		X	
Constrain	X		
Accept			X

Signatures

Project Sponsor Date

Project Manager Date

Primary Inventor Date

Appendix E: Requirements Documentation

Business Need

A niche has been identified in the outdoor equipment market for ultra-light, high-performance personal shelters. Established consumer markets exist for outdoor tents, sun shades and shelters, although there appears to be no market presence of lightweight all-terrain shelters specifically designed for photographers, videographers, hiking and hunting enthusiasts, or other outdoor recreationalists.

Requirements documentation, along with a Requirements Traceability Matrix will show how project requirements meet the business need, while tracking requirements throughout the project lifecycle. A Requirements Management Plan will be developed to describe how requirements will be documented, analyzed and managed during the project. Main requirements for various aspects of the project are categorized below:

Project Requirements

- Change control system; control scope to maintain uniqueness, enhance product utility.
- Risk Management Plan and Metrics, Process developed for managing uncertainty, Opportunity enhancement plan.
- Risk/Opportunity analysis; weekly review of upcoming uncertainty, risk response planning.
- Performance tracking metrics including CPI, SPI, TCPI, and also subjective feedback from target market, retail and consumer.
- Documented Quality Assurance and Continuous Improvement processes.
- Ability to adapt Risk, Scope management and Quality Processes and Metrics to other consumer product invention ideas.
- Provisional Patent Application must be complete, reviewed by Patent Agent
- Decision to apply for Non-Provisional (NP) Patent must occur within 12 months of PPA filing.
- Patent search must be sufficiently exhaustive to provide 80% confidence that no similar prior art exists.
- New Business license filing, legal requirements met, and accounting system in place.
- PPM Deliverable Requirements
- Marketing cost assessment; marketing methods analysis

Product Requirements

- Product concept is unique; not found on retail market.
- Concept is feasible to build, within personal skills and current financial capability to produce.
- Concept does not infringe on existing patents, or pending patent application claims

- Concept design shall be functional, collapsible, and capable of providing adequate weatherproof coverage.
- Shelter design must be able to withstand 40 mph winds; capable of shedding sustained rain and snow.
- Shelter design shall be adjustable to accommodate varying terrain gradients, brush, tundra, and forested environments.
- Target market must be identified, quantified and exposed to product.
- Limited competition, similar but different products available on market.
- Shelters must be sold with all required components; stuff sack, stakes, etc.
- Product liability: Risk Management transfer strategy.
- Process for estimating cost of NP Patent application activities; comparison to revenue projection and financial forecast

Requirements Traceability Matrix

WBS Work Package	Activity Description	Requirement	Stakeholder	Acceptance Criteria
1.3.1 & 1.2.3.1	Develop Product Design; Product and Market Analysis	Original Product Concept	PI, Market Competitors	No similar product identified to Date
1.2.3.1 & 1.2.1.1	Concept Feasibility Assessment; Develop Product Design	Design feasible to construct in-house, requires no special technology or equipment	PM, PI	Design constructible within available means
1.5.1	Patent Search Strategy and Activities	Concept does not infringe on existing patents, or pending patent application claims	PI, Patent Agent, USPTO	Successful patent search activities, complete capture of patent classifications
1.5.1.5	Contact Patent Agent (Inactive)	PPA must be complete, reviewed by Patent Agent if necessary	PM, Patent Agent	Properly filed PPA
1.2.4.1 & 1.2.4.3	Design and Materials Testing	Concept design shall be functional, collapsible, capable of providing adequate weatherproof coverage.	End Users	Validated Design; Testing conducted in field
1.3.1	Market Analysis, Segmentation, Target Markets ID	Market must exist with similar but technically different products	End Users	Quantified Markets; activity completion
1.2.4.3	Design Testing	Shelter design must be able to withstand 40 mph winds; effective at shedding rain and snow.	PI, End Users	Design tested and proven in field

WBS Work Package	Activity Description	Requirement	Stakeholder	Acceptance Criteria
1.2.4.3	Design Testing	Shelter design shall be adjustable to accommodate varying terrain gradients, brush, tundra, and forested environments.	PI, End Users	Design tested and proven in field
1.3.1 & 1.4.5	Market Analysis; Test Market Response	Target market must be identified, quantified and exposed to product.	PM, End Users	Measurable target market; Weekly product exposure to public
1.1.2	Risk, Scope, Quality Management Activities	Lessons learned documented, update project documents to improve risk, performance and quality processes.	PM	Ten Lessons Learned that improve project work efficiencies
1.1.2	Risk, Scope, Quality Management Activities	Change control; change management plan, control scope to maintain uniqueness, enhance product utility	PM	Validated shelter design, modified if necessary; unique shelter product
1.1.2	Risk, Scope, Quality Management Activities	Risk/Opportunity analysis; weekly review of upcoming uncertainty, risk responses	PM	Risks are managed as they occur; new risks identified, Risk Management improves in process.
1.4.1 & 1.3.4	Evaluate Target Market; Market Analysis	Product fills a niche that is unmet and adds value for end users	PM, End Users	Shelter provides utility not found on market
1.5.4.4	Submit and File Provisional Patent Application	Obtain "Patent Pending" rights to product.	PI, Patent Agent, USPTO	Successful filing of PPA
1.4.4.5	Assemble and Package Shelter	Shelters must be sold with all required components; stuff sack, stakes	PM, End Users	Checklist to ensure final shelter product units are complete
1.4.1	Business Filing; Accounting System	Fully protected business entity; operation agreement, articles of organization, licensure and tax reporting	PM	ATC Company, PM
1.4.5	Test Market Response	Consumers and Retailers within target market exposed to product	PM, End Users	Accepted upon successful activity completion
1.4.3	Build and Publish Website	Informational website with product photos, videos, descriptions and specifications, paypal or CC purchase capability	PM, End Users	Completed website with full descriptions, specification, photos and video links

WBS Work Package	Activity Description	Requirement	Stakeholder	Acceptance Criteria
1.1.1	PMP & Project Doc Management, PPMs	Completed PPM deliverable requirements, on time and ready for briefing	PM	Completion of PM686B
1.1.2	Risk, Scope, Quality Management Activities	Risk Management plan for invention assessment and patent search	PM	Improved Risk Management ID and Quantitative Analysis Processes
1.1.3	Risk, Scope, Quality Management Activities	Performance Measurement plan for invention assessment	PM, Sponsor	Measurable tangible or intangible project performance
1.4	Invention Assessment Activities	Invention Assessment: Product must sell, have limited competition, show measurable signs of sustained marketability	PM, User Groups	Sales of 3 shelters within 90 day Test Market Response activity
1.1.2	Risk, Scope, Quality Management Activities	Risk transfer strategy to limit manufacturers liability; warning labels and disclaimer	PM, PI, User Groups	Warning label shall be produced to mitigate and transfer risk of product injuring user
1.4.4.5	Assemble and Package Shelter	Limited lifetime warranty language draft; product sale price contains contingency for warranty repairs	PM	Warranty information provided with shelter; shelters pricing includes warranty
1.5.2	Phase Gate 3 Go / No Go	Process for estimating cost of PPA Filing and Invention assessment activities; comparison to revenue forecast	PM, PI, User Groups	Invention assessment provides measurements of commercial viability
1.3.3	Estimate Revenue Range and Cost of Delivery	Marketing cost assessment; marketing methods analysis and refinement	PM, Marketing Consultant	Marketing approach is focused, with perceived benefit outweighing cost; visually exposes shelters to 5% of target market

Appendix F: Risk Register

Project Risk Register contains the following information:

- Identified Primary Risks
- Project Objective or Work Activity Affected
- Risk Response (RR) or Corrective Action (CA) Activity
- Qualitative Risk Rating

Risk Rating	Risk #	Primary Risk	Project Objective or Activity Affected	Risk Response
45	1	A competitor copies product design and delivers a similar product to market faster, or in higher quantities, negatively affecting marketability of shelter	Objective: Invention assessment introduces original product to market first; File PPA activities	Substantiate Originality; RR 1.4.4.3; Create Inventor's Log, document design, function and method of operation to establish first to invent rights to concept.
10	6	Shelter does not meet stated performance goals or fails QC measurement limits in field tests, decreasing product utility.	Shelter does not meet quality requirements; shelter does not provide high-utility.	Redesign Work; RR 1.1.5.4 & Alternative Materials Order; RR 1.1.5.2: Implement design changes, integrate more suitable materials
18	8	Patent search activities prove too difficult to ascertain product originality, increasing risk of patent infringement.	Patent search activities; Provisional Patent Application (PPA) filing activity.	Contact Patent Agent; RR 1.4.1.4: Contact Patent Consultant, focus all effort towards patent search, procure strategy manual.
20	2	Target market does not respond to shelter product, diminishing effectiveness of Quality Management Plan	Test Market Response activity; develop marketable product objective.	Accept
32	3	Shelter design infringes on prior art in existing patents, affecting project originality and company liability	Patent search activities; creating an original product objective.	Provide Documentation; RR 1.3.6 Liability is limited to revenue from product which is accounted for; if cease and desist order is served company will comply, provide required documentation; implement Redesign Work; RR 1.1.5.4

Risk Rating	Risk #	Primary Risk	Project Objective or Activity Affected	Risk Response
3	4	Raw materials vendors may increase pricing or lead times, increasing costs which may put shelter pricing above user requirements.	Shelter production activities; pricing does not conform to user requirements.	Inquire about future pricing; Establish agreements with multiple materials vendors - higher COGS may be necessary
30	5	Shelter design may be too difficult to setup, take down, or easily be used in "all conditions."	Shelter does not meet functional requirements; too complicated for users to easily use.	Provide Instructional DVD; CA 1.3.4.7: RR Shelter is designed to be pitched in less than 90 seconds, additional instructional video provided on website and with shelters.
40	7	No shelters sell during Test Market Response activity, decreasing appearance of product viability.	Demonstrates shelter does not provide a marketable concept.	Change Marketing Approach; CA 1.3.8: Contact marketing consultant, manufacturer; plan trade show, consistently advertise shelter weekly throughout activity.
5	9	Shelter development process costs significantly more than planned, exceeding approved product development budget.	Delivery of shelter not within end-user cost-benefit requirements.	Procure enough materials initially to build prototype and production shelters.
30	10	Shelter product injures end-user, causing financial damages affecting approved project budget.	Product liability damages cost project money that cannot be used for product development.	Create warning labels that explain potential hazards of operation and state "all risks" associated with product use accepted when purchased.
27	11	Targeted B2B retail market has little to no interest in selling shelter; not willing to purchase and stock in store therefore diminishing product exposure.	Test Market Response activity; shelter product will not get retail exposure.	Go to Web; RR 1.3.7 All product distribution and sales are B2C thru website, enhance web presence by contacting online outdoor product retailers

Risk Rating	Risk #	Primary Risk	Project Objective or Activity Affected	Risk Response
10	12	PM's shelter production tools fail, causing delays in Prototyping, Design Testing, and Test Market Response activities.	Prototyping and production activities delayed, as well as subsequent market testing; may increase budget if new tools are required.	Machinery Purchase; RR 1.3.4.3 Maintain production tools, have additional machinery and tools located for quick purchase if needed.
8	13	Certain consumer quality requirements exceed design or production capabilities, causing loss of public interest with in target market.	Test Market Response activity; development of marketable product concept objective.	Shelter will be designed to meet core quality requirements, may be limited in requirements inclusion
8	14	Initial demand for shelter is significantly higher than expected, impacting consumer delivery expectations; loss of potential market share.	Effects of risk cause failure to meet actual market demand.	Develop relationships with manufacturers, or firms having capacity to produce shelters; create agreement for services.
45	15	Invention assessment demonstrates that development of shelter, and Patent filing requirements exceed benefits of bringing shelter to market.	Risk impact is on entire project; failure to produce a marketable concept.	Accept risk

Risk Probability and Impact Assessment

Probability & Impact Risk Rating (1 low - 5 high) | Detection (3 none - 1 immediate) | Risk Rating (>37 low-medium / <37 medium-high)					
Probability	**Impact**	**Detection Time**	**Risk Rating**	**Risk #**	**Primary Risk**
3	5	3	**45**	**1**	A competitor copies product design and delivers a similar product to market faster, or in higher quantities, negatively affecting marketability of shelter
2	5	1	**10**	**6**	Shelter does not meet stated performance goals or fails QC measurement limits in field tests, decreasing product utility.
3	3	2	**18**	**8**	Patent search activities prove to be too difficult to ascertain product originality, increasing risk of patent infringement.
2	5	2	**20**	**2**	Target market does not respond to shelter product, diminishing effectiveness of Quality Management Plan
4	4	2	**32**	**3**	Shelter design infringes on prior art in existing patents, affecting project originality and company liability

Probability & Impact Risk Rating (1 low - 5 high) | Detection (3 none - 1 immediate) | Risk Rating (>37 low-medium / <37 medium-high)					
Probability	**Impact**	**Detection Time**	**Risk Rating**	**Risk #**	**Primary Risk**
1	3	1	**3**	**4**	Raw materials vendors may increase pricing or lead times, increasing costs which may put shelter pricing above user requirements.
3	5	2	**30**	**5**	Shelter design may be too difficult to setup, take down, or easily be used in "all conditions."
4	5	2	**40**	**7**	No shelters sell during Test Market Response activity, decreasing appearance of product viability.
1	5	1	**5**	**9**	Shelter development process costs significantly more than planned, exceeding approved product development budget.
2	5	3	**30**	**10**	Shelter product injures end-user, causing financial damages affecting approved project budget.
3	3	3	**27**	**11**	Targeted B2B retail market has little to no interest in selling shelter; not willing to purchase and stock in store therefore diminishing product exposure.

Probability & Impact Risk Rating (1 low - 5 high) | Detection (3 none - 1 immediate) | Risk Rating (>37 low-medium / <37 medium-high)					
Probability	**Impact**	**Detection Time**	**Risk Rating**	**Risk #**	**Primary Risk**
1	5	2	**10**	**12**	PM's shelter production tools fail, causing delays in Prototyping, Design Testing, and Test Market Response activities.
4	2	1	**8**	**13**	Certain consumer quality requirements exceed design or production capabilities, causing loss of public interest with in target market.
1	4	2	**8**	**14**	Initial demand for shelter is significantly higher than expected, impacting consumer delivery expectations; loss of potential market share.
3	5	3	**45**	**15**	Invention assessment demonstrates that development of shelter, and Patent filing requirements exceed benefits of bringing shelter to market.

Appendix G: Project Charter

Project Purpose

It is estimated that 1-3% of patented inventions produce profits for the inventor. The cost of filing and examination fees for a non-provisional patent can range from $2,000 to $10,000 and beyond. ATC Company understands this uncertainty, and will undertake a project to effectively measure the marketability of a new shelter product, and determine its originality, prior to investing a patent. The Idea to Invention (I to I) project objective is to apply Project Management principles and deliver a process for materializing an idea, measuring its utility and commercial viability as a product, conducting an exhaustive patent search and producing a thorough Provisional Patent Application (PPA). Specifically, the project will deliver both a product line of personal shelters and a process for establishing first to invent rights to patenting the shelter's function and method of operation.

Objectives to Meet Requirements

Project Objectives	Requirements
Create and deliver a personal shelter with marketable attributes that conforms to user requirements	• Develop and define user requirements for shelter design • Conceptualize and construct shelter prototypes • Measure and improve product performance • Create methods of product delivery
Product must be original and shall not infringe upon existing prior art	• Establish effective patent search strategy and activities • Obtain all relevant patent classification and sub-classification numbers; conduct exhaustive patent search to achieve 80% confidence design does not infringe upon prior art
Establish go/no-go milestones	• Define checkpoints for measurement, project analysis, and critical decision making • Establish performance criteria for evaluating project performance, acceptance or termination
Conduct effective invention assessment activities to demonstrate concept product viability	• Produce a shelter that fulfills consumer requirements • Determine if shelter can be delivered at the right price or no less than twice the cost of goods sold • Determine if shelter can be delivered to market effectively enough to sell three units during project • Validate shelter design conforms to legal

	and safety requirements
Idea to Invention Process and Project Management application improvements	• Document efficiencies and improvements in patent search and invention assessment activities • Develop product quality analysis tool and measurements • Refine Risk Identification, qualitative and quantitative analysis methods • Fine-Tune Scope management tools for defining and sequencing work; and also, improve change management process • Develop lesson learned repository and application methodology

Initial Resources and Authority

The Project Management Team shall consist of the following resources:

- Project Manager (PM) retains full authority and will lead efforts in project management.
- Primary Inventor (PI) will provide concept and technical development assistance.
- Project Sponsor (Sponsor) will support PM in project guidance.

Project Description and Task Assignments

The following project description will outline the scope of work. Tasks derived from the project description will be assigned to members of the Project Management Team

Description	Task	Assignment
Develop Concept	Construct and test working concept prototype	Primary Inventor
Product Testing, Analysis and Improvement	Develop and refine product, test limits and improve design	Project Manager, Primary Inventor
Assess Product Marketability	Define target market, develop methods for initial market entry	Project Manager, Primary Inventor
Evaluate Viability of Product	Estimate market share, develop means of production and conduct invention assessment	Project Manager, Project Sponsor
File Provisional Patent Application (PPA)	Conduct exhaustive patent search and submit required filings for PPA	Project Manager, Project Sponsor, Primary Inventor

Project Milestones

The Idea to Invention project will have five main scheduled milestones:

1. Deliver and Present Project Management Plan – 4/22/14
2. Tested and Improved Prototype – 6/17/14
3. Patent Search Documentation – 9/2/14
4. Complete Invention Marketability Assessment 9/26/14
5. Successfully file Provisional Patent Application (PPA) – 9/30/14

Estimated Project Cost - $3,397

- Project Management - $997
- New Product Development - $1100
- Patent Application Filing Fees - $700
- Consultancy fees - $600

Key Stakeholders

- Primary Inventor
- Project Manager
- Project Sponsor
- United States Patent and Trademark Office (USPTO)
- Market Competitors
- Marketing Consultant
- Patent Consultant
- ATC Company

Project Approval Requirements

Dan Aicher, Project Manager (PM) has full authority to assign, manage, and expend resources on the Idea to Invention Project. The PM will also approve corrective actions, consultant agreements, and all project invoices. The PM and Project Sponsor will certify that each component of the project is accepted as complete. Project Sponsor has authority to invest additional funds in product marketing and patent related activities, and will provide technical assistance to the PM as necessary. Primary Inventor (PI) will maintain authority over product design, patent search and PPA filing activities.

Signatures

Name/Title	Signature	Date
Project Manager		
Primary Inventor		
Project Sponsor		

Appendix H: Research Methods, Sources and Expected Results

Idea to Invention (I to I) Project will utilize both analytical and applied research to formulate processes to help answer the questions "Is it worth my time to invent this new idea?" and "How much consumer demand will there be if I do invent this idea?"

Research Sources

The following sources of research will be utilized in identifying and defining effective, PM applied patent search and investment assessment processes:

- United States Patent and Trademark Office (USPTO) Patent and Application Full Text Database
- Literature search of Provisional Patent Application requirements, patent search strategies, and patent classifications.
- National Oceanic and Atmospheric Administration, National Climactic Data Center
    - Regional historical weather data for Alaska and the Northwest
- State of Alaska Department of Fish and Game; Department of Natural Resources
    - Resident and Non-Resident historical sport-fishing and big-game hunt licensee database
    - Parks and Outdoor Recreation, State Parks Day Use Pass issuance

Key Words

- New Product Development (NPD)
- TRIZ - "Theory of Inventive Problem Solving"
- Invention Assessment
- Market Analysis for consumer products
- Patent Search Strategy

Research Methodology and Approach

Following a literature review of the topics listed above, the project will use statistical analysis on target markets to estimate populations of user groups and quantify the amount of time they could realistically be exposed to utilizing the shelter. Statistical analysis will also segment user groups, their needs and buying preferences, which will direct the focus of marketing activities. Product marketability research will be conducted by testing local demand.

Concurrently, a comprehensive domestic patent search will be undertaken to research the patentability of a product idea. Patent search methods will evolve and develop as the project is elaborated, although initial patent research methods will be based on patent classification searches to start gathering groups of related patents. Multiple patent search strategies are being developed to devise an approach to gathering as many relevant patent claims as possible.

Expected Results of Research

Project expects to acquire significant amounts of information on Product Lifecycle Management, New Product Development, and TRIZ, the Theory of Inventive Problem Solving. The project scope of work does not include complete application of these disciplines, but rather will learn and apply the most relevant concepts to help guide Idea to Invention project.

Patent research will progressively define search strategies, while reviewing and eliminating individual patent claims. The project expects to identify up to 30 patent classifications. It is likely that the PM will review 5,000 – 10,000 non-provisional (NP) patents and 500 – 1,000 NP patent applications.

The project will also extensively research historical weather data, as it directly pertains to the amount of need of user groups will experience while recreating outdoors. Weather research will be segmented by historical climactic data on Alaska, Oregon and Washington to determine the probabilities of need based on location and time of year. Market research will include information gathering on individuals who recreate outdoors for extended periods of time. This research is predicated on State of Alaska agency databases, and specifically the amount of people who legally obtain permits to recreate outdoors. The project expects a population of total target markets, in Alaska, to be approximately 25,000 – 35,000 people. When target markets in Oregon and Washington are included, the population of user groups is expecting to be approximately 75,000 – 110,000 people.

Project Charter

Idea to Invention

Project Purpose

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Signatures

Name/Title	Signature	Date
Project Manager		12/8/14
Primary Inventor		12/8/14
Project Sponsor	FOR: CHRIS BROOKS	12/8/14

Sponsor Letter

Idea to Invention

The Idea to Invention project was completed on December 3, 2014. Dan Aicher, Project Manager, planned and executed the work undertaken to complete five (5) main project objectives. Chris Brooks, Project Sponsor, provided support and validated deliverables throughout the project duration.

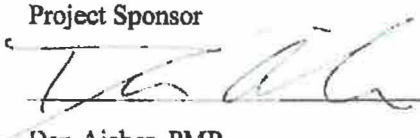
Project objectives are listed below in order of priority:

1. Deliver ATC invention concept
    a. Completed September 2014: Three (3) separate but similar ATC designs have been tested, improved and completed to 100% design as shown in the "Product Scope Description", and Appendix A of the Project Report.
2. Draft and file Provisional Patent Application (PPA) – "Adjustable Tent; All Terrain Cover"
    a. Completed October 2014: PPA filing receipt is provided in Appendix B of the Project Report.
3. Assess consumer demand for ATC product
    a. Completed 12/1/14: Project concluded consumer demand as moderate and that the current pricing is high enough to suppress excessive demand.
4. Sell five (5) ATCs within the 25-day Test Market Response work activity
    a. As of 12/3/14 the Project Manager has received orders for ten (10) All Terrain Covers.
5. Conduct patent search and evaluate the ATC's patentability
    a. Preliminary patent search completed on May 13, 2014. Strategic patent search completed on October 20, 2014. The project reviewed approximately 3,700 patents. Three existing patents were found to be similar; although, not similar enough to warrant design changes to the ATC's function and method of operation. Project concludes that the ATC is likely patentable, and recommends the PM pursue filing a non-provisional patent application.

I, the Project Sponsor, accept the Idea to Invention project as complete. The project objectives have been completed as of the dates shown above. All project deliverables have been validated and are represented in the Idea to Invention Project Report, Appendix A and B, and the Project Management Plan.

12/8/14

Chris Brooks, MAM, MBA — Date
Project Sponsor



12/8/14

Dan Aicher, PMP — Date
Project Manager